AMERICAN GAS JOURNAL

AUGUST, 1933 Price 25c

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Equipped with Self-Supporting Radiants, Minneapolis-Honeywell Electric or Remote Mechanical Controls, Emco Gas Pressure Regulator and Automatic Pilot.

—POPULARLY PRICED—

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ROBERTS-GORDON APPLIANCE CORPORATION

Buffalo, New York

Magic Chef

NATIONAL ADVERTISING *is* DOUBLE-EDGED . . . .

MAGIC CHEF national advertising is a keen-bladed sword which has been tempered and tested by 14 years of persistent effort in educating women to more advanced methods of cooking.

In its advertising over this period, American Stove Company has always kept foremost the twofold purpose of stimulating the sale of better gas ranges and promoting the larger use of gas as a cooking fuel.

This year the double-edged effectiveness of American Stove Company's national advertising is even greater than it ever was before. Millions of advertisements in the leading National Magazines dramatically present the story of special Magic Chef features in such a way that American housewives will be responsive and ready for effective demonstration.

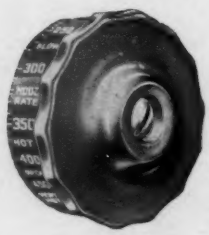
The other keen edge of this advertising, the promotion of gas as the ideal fuel for cooking, represents substantial co-operation in protection of the cooking load, as our contribution to an urgent need of the gas industry.

One of the series of full page Magic Chef advertisements appearing in leading national magazines this Spring

AMERICAN STOVE COMPANY

World's Largest Manufacturer of Gas Ranges

NEW YORK • PHILADELPHIA • ATLANTA • CLEVELAND
BOSTON • CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES



Look for the
RED WHEEL
When you buy a
MAGIC CHEF

Magic Chef

AMERICAN STOVE COMPANY

(Look for this Trade Mark)

AMERICAN GAS JOURNAL

Established 1859

August 1933

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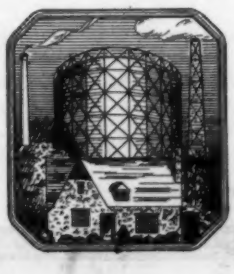
PUBLISHED MONTHLY BY
AMERICAN GAS JOURNAL, INC.
53 Park Place, New York

S. G. KRAKE, *President and Treasurer*
A. M. GLEASON, *Secretary*
H. M. RILEY, *Editor*
R. S. MCBRIDE, *Consulting Editor*

ADVERTISING REPRESENTATIVES:
R. H. PIERCE, *53 Park Place, New York;* THOMAS MORGAN, *168 N. Michigan Ave., Chicago, Ill.;* HARLEY R. MANKIN, *9906 Theodore Ave., N.W., Cleveland, Ohio;* NORMAN C. NOURSE, *681 Market St., San Francisco, Cal.*

Subscription $2.00 per year U. S. A.; $4.00 Canada; $4.00 Foreign. Single copies 25 cents.



VOLUME 139
NUMBER 2

WHOLE
NUMBER 3716

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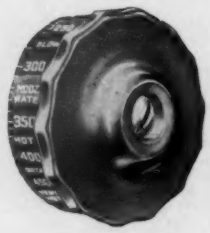

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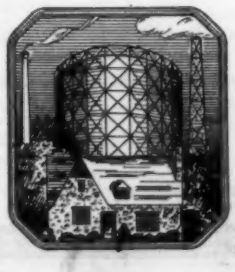

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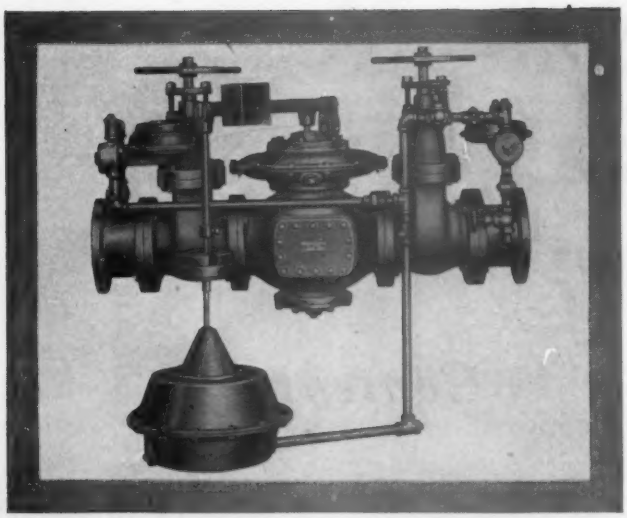


REPORT SHEET August 3/33

Reynolds District Station Regulator installation complete—limits of control satisfactory—operating performance checked through the range of conditions—Job O.K.

SIGNED F.B.

THIS report could be that of any gas control unit installed—and it means nothing except a new Regulator has been properly installed. The real O. K. of the installation can only come after 10 or 20 years of operating performance under all kinds of conditions and under varying consumption demands.

Reynolds for their own information have checked the history of many of their District Station Regulators, in service for 10, 20 years, and longer. In every case, except for minor repairs, these Regulators have records of satisfactory operating performance, which is the real O. K. of the installation and it is upon such evidence as this that Reynolds base their claim to superiority in the manufacture of gas control units.

All of Reynolds Regulators are precision built of rigidly inspected material. Completed units are tested for efficiency and accuracy and records of the tests filed at the factory. Copies of these tests are sent with each regulator. This makes it possible for Reynolds, as well as the purchaser, to check on the unit and is an important maintenance detail that determines the efficiency and actual costs of any mechanical installation shortly after installation or years later.

Reynolds Service to those in the field is valuable—make use of their Engineering Department in working out Gas Control problems and building regulators that will answer your needs. Feel free to write for literature and help on any Gas Control problem.

● REYNOLDS BRANCH OFFICES: 421 Dwight Building, Kansas City, Mo.; 2nd Unit, Santa Fe Building, Dallas, Tex.

● REPRESENTATIVES: Eastern Appliance Co., Boston, Mass. F. E. Newberry, Avon, N. J.

REYNOLDS GAS REGULATOR COMPANY

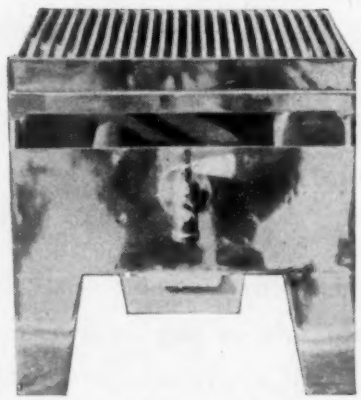
Anderson, Indiana, U. S. A.

GAS CONTROL SINCE 1892

Correct Broiling

with the

INSTANT RADIANT GRILL



All the heat from four rows of radiant flame jets is reflected by aluminum reflectors directly up through the grill bars on to the meat.

It has a V shaped centre piece that conceals and protects the grease tray from the fire.

Easy to adjust for any kind of gas as there is no Bunsen burner.

Entirely made of cast aluminum, highly polished.

An all-the-year-round load builder and PRICED RIGHT.

Write for descriptive booklet.

Radiantlog Corporation

10 Chelsea Place, E. Orange, N. J.

Editorials

Something Ought To Be Done About This

THIS morning your editor was given an earful by a fellow commuter anent the torrid weather which recently has been afflicting a major portion of the country. "One hundred and two in Albany, ninety-five in New York, ninety-eight in Baltimore, ninety-five in Pittsburgh," droned the fellow commuter, as he labored through the government weather report. And then—"what about this proposition of air cooling for the home?" he questioned with a considerable addition of mental heat.

Your editor swabbed weakly at the inside of his collar and did a bit of reflecting. He recalled a visit to some friends' home on the previous day, said domicile being air conditioned—by electricity. He wondered why more homes are not being sold on air conditioning. More, he noticed the paucity of advertisements on the subject. All of which compels us to ask "when are we going to do a real selling job to the end that many folks will be relieved of the Tophet-like torridity of summer?" And could there be a better excuse for advertising and sales effort along this line than the present hot and humid spell we have been laboring through?

Something ought to be done about this.

N. R. A.

AS the *Journal* sees the National Recovery Act, its success depends on the acceptance of common sense plans or codes by the government which the various industries can adopt and each do its part to make it a success. If the government plans to force all industries to conform to a certain procedure or code, then it can look for resistance in many quarters. It is not a plan of giving the edge in the bargain to either industry or labor. What is good for one is good for the other and both should enter into the arrangement with that in mind. So far as the gas industry is concerned, it is a 24 hour a day one. We believe the majority of gas companies are paying employees the average scale of wages as put forth in the general code. On the other hand, its rates for gas are fixed by law in the various states. The tendency is to continually increase taxes of utilities on one hand, and the politicians demanding lower rates on the other. It can't be done if a healthy condition is to be maintained in the industry as a whole. There may be some weak spots, but those can be ascertained and rectified without putting a burden on the industry so great that it cannot meet the demands of the government and keep up its plants in good working order, make extentions of service where needed and enter into many activities to give a constantly increasing service to its customers.

The gas companies as a whole have always been ready to join any movement for the betterment of the community in which each operate. The *Journal* knows it will be glad to go along with the N.R.A. to every reasonable extent, but the U. S. Government and the state governments must bear in mind that they can't "have their cake and eat it too." Lowering rates and increasing taxes is bound to produce in the end a lessening of the service that the industry is giving today to millions of satisfied customers. The *Journal* hopes therefore, that General Johnson will take all of the facts into consideration and accept a horse sense code for the gas industry which will not work injury to it, but which will permit the utilities to continue their service, and be able to finance further extensions of service for the benefit of all.

What The Figures Show

ELSEWHERE in this issue will be found the Summary of Gas Company Statistics for May, 1933. A perusal of the chart and information in the text offers information that is at least a trifle comforting.

We find that the sales of natural gas for May is equal to the figure for the same month a year ago. Further, the sales curve is not sweeping down so steeply as was the case in '32. At the same time, the revenues for natural gas, for the same period, almost equalled the revenue received in '32. Here too the decline is not so precipitous as a year ago. And, as the item states, "increase in industrial gas sales was prevalent in most natural gas territories, reflecting pronounced gains in industrial activity and production registered during the month."

While the manufactured gas division of the industry does not show up quite so well as that concerned with natural gas, still there are encouraging signs in the offing and September's figures should offer a tolerably good barometer as to what we might expect in the near future.

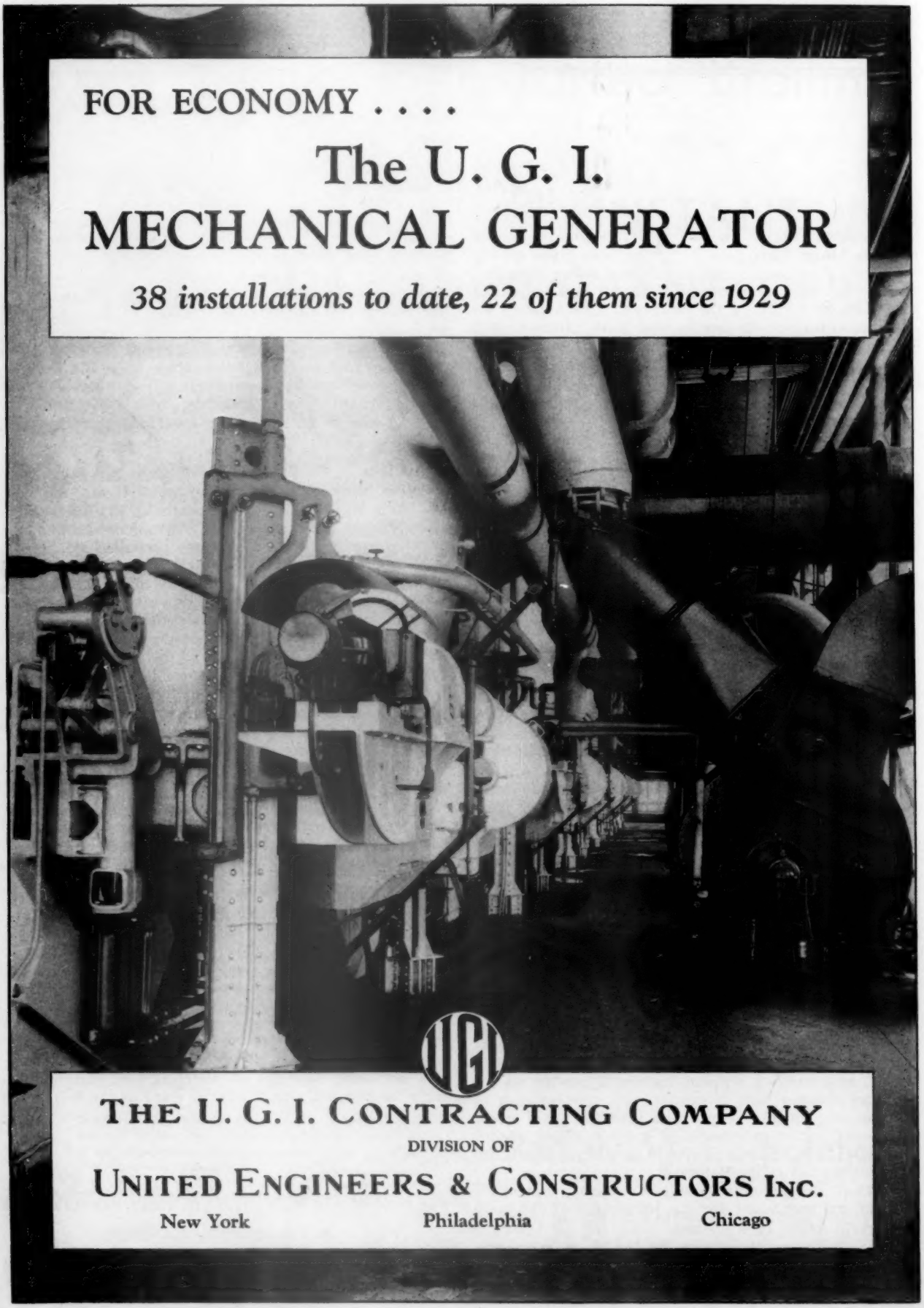
Retold With Emphasis

THE recommendations presented before the Executive Conference, American Gas Association, by the advertising firm of Ayer, while being known by a number of gas men for some years past, are well worth repeating—and, in this instance, Ayer has brought them home with the proper emphasis.

Further, as the matter now stands, there seems to be only question to be propounded—what are we going to do about it? It is plain that the short cut to success lies along the way of adopting and putting into force the proposals, or at least as many as can be practically handled.

Henry M. Riley

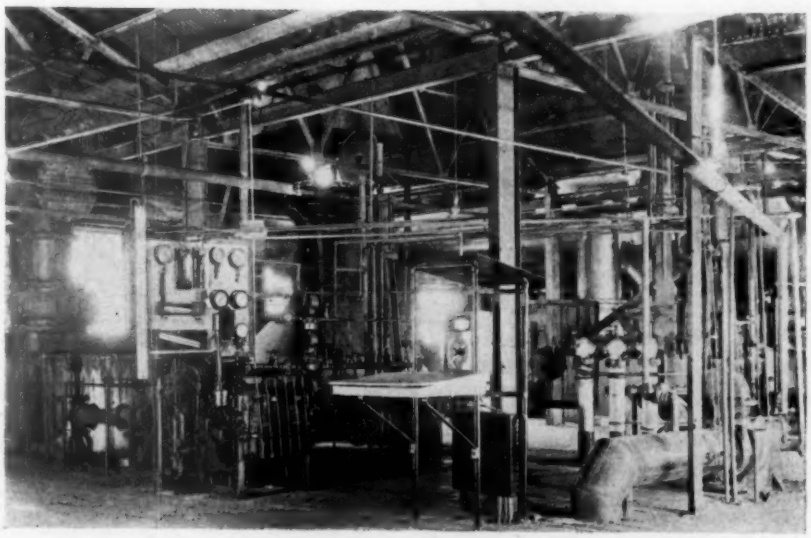
Editor.


FOR ECONOMY . . . .
The U. G. I.
MECHANICAL GENERATOR
38 installations to date, 22 of them since 1929
UGI
THE U. G. I. CONTRACTING COMPANY
DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS INC.
New York
Philadelphia
Chicago

AMERICAN GAS JOURNAL
August
1933

REFRACTORY SCREEN Oil Gas Tests in Denver

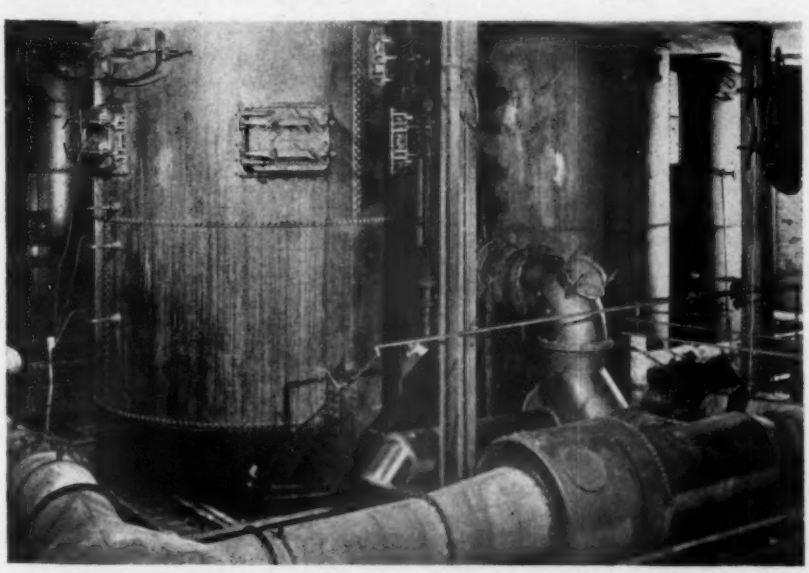
By GEO. WEHRLE
Superintendent Gas Department
Public Service Company of Colorado,
Denver, Colorado



Operating Floor—Refractory Screen Oil Gas Process

IN order that a substitute for natural gas could be provided which would give its customers a minimum of utilization difficulty in case of emergency, and which at the same time would increase the thermal capacity of the manufacturing plant, Public Service Company of Colorado recently converted two eleven-foot water-gas sets to the refractory Screen Oil Gas Process in Denver.

This process, developed by Combustion Utilities Corporation, has been fully described in articles previously published. The conversion work required on an ordinary water-gas machine consists substantially of a refractory screen installed in the generator, oil burners in generator and carburetor for heating purposes, and suitable oil sprays and air connections. Fundamentally, the process is similar to water-gas operation with the coke bed replaced by a bed of refractory material. The refractory screen cracks the oil sprayed into the top of generator to 500 B.t.u. gas which is enriched by oil sprayed into the top of the carburetor to the desired heating value. Carbon resulting in the generator is retained in part on the refractory screen and by means of up and down blasting is consumed supplying the heat for cracking the generator oil in the next cycle. Steam is used to react with the carbon deposit and to purge the apparatus of oil gas before the stack is opened. The heat in carburetor and superheater is maintained by use of an oil burner in the carburetor and suitable use of secondary air. The unit is brought to gas-making temperatures with oil burners located in the bottom of generator and top of carburetor. About three hours is required to heat the set to proper operating temperatures of 1600° F. on a shielded wall thermocouple at bottom of generator,



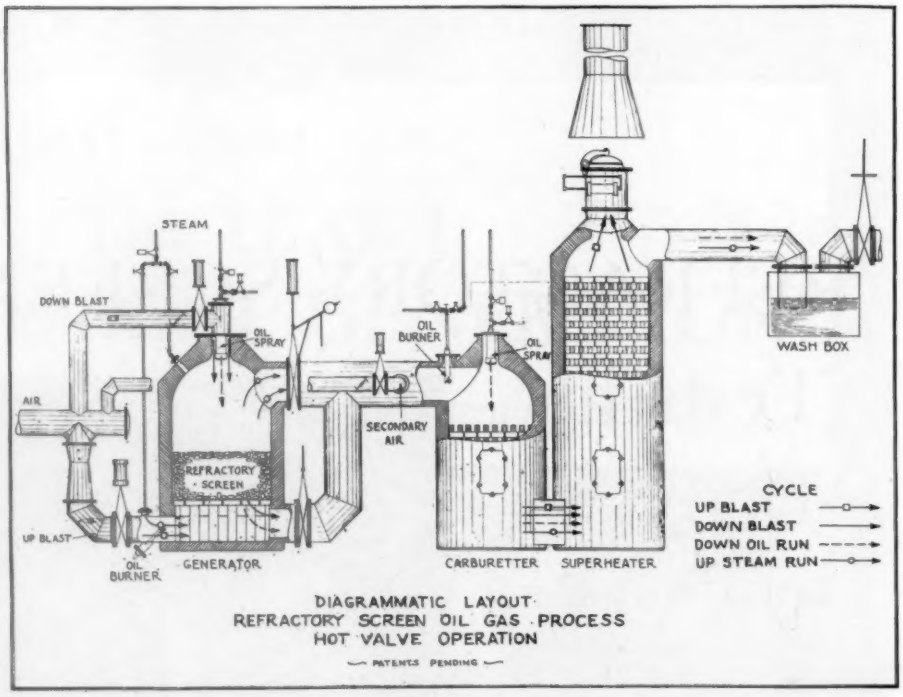
Air Blast Piping—Refractory Screen Oil Gas Process

1800° F. at carburetor, and 1500° F. at superheater.

Test operations covering parts of several days were conducted in Denver. The results of these operations are hereinafter summarized. The purpose of the operating test was: (1) to place both converted units in operating condition so that they might be started up quickly in the event of an emergency; (2) test out and place in operating condition all auxiliary plant equipment incident to production function; (3) establish capacity of generating and auxiliary equipment; and (4) obtain utilization performance of the oil gas produced in the customers' appliances. In the interest of economy, it was decided to carry out these objectives over as short a test period as possible, placing greatest emphasis on (1) readiness to operate, (2) capacity, and (3) training of operating personnel. A schedule of manufacturing operations was carried out which covered:

1. The starting of No. 1 unit to test auxiliary equipment and conversion installation, purging of plant piping and equipment, operation of generating equipment, and training of operators.
2. The starting of No. 2 unit to place it in operating position. To further test out auxiliary plant equipment and train operators.
3. To place both units in proper phase relation as to blast and make and test out generation and plant equipment under normal conditions of operation and to establish generating and other plant capacities.

Test operations were actually begun on May 31 and were resumed on June 1 and 2 to complete Phase No. 1 listed above. All plant piping and equipment, having been tested for tightness and operating function with air supplied from the water-gas blowers, was purged with the products of combustion from the heating-up burners of the set. The inert gas was later purged out of the system by the oil gas made through an 8" opening provided ahead of the inlet valve to storage holder. During this phase of operations, generation equilibrium was satisfactorily established with the use of a Bunker C fuel oil and cracked gas-oil mixture.



DIAGRAMMATIC LAYOUT
REFRACTORY SCREEN OIL GAS PROCESS
HOT VALVE OPERATION
— PATENTS PENDING —

The gas produced was distributed to a section of the city which could be isolated, containing about 14,000 customers. This gas, with a heating value of 1100 B.t.u. and specific gravity of 0.729, was distributed from 4 a. m. to 4 p. m. on June 2 without mixture with natural gas. One hundred and ninety-six complaints were received from customers in this district, classified as follows:

Leaks	57, or	29.1%
Flash-Backs (all water heaters)	20, or	10.2%
Yellow-Tip Flame	117, or	59.7%
Miscellaneous	2, or	1.0%
Total	196, or	100.0%

The total complaints from this district for the 24-hour period of June 2 represented 1.4% of the total number of customers in the district. The leak complaints were undoubtedly caused by the distinctive and different odor of the new gas. Laboratory tests indicated that the flash-backs, which all occurred in one certain type of water heater, were caused by improper adjustment, although the appliances had been operative with the normal natural gas. The smoky-flame complaints likewise occurred on burners not properly adjusted, although apparently burning satisfactorily with natural gas. A good many thousand appliances of all kinds burned equally as satisfactorily with the substitute gas as with natural gas and established to our entire satisfaction the practicability of the use of the oil gas during emergencies.

Phase No. 2 was started June 5 and Phase No. 3 on June 6 when the test operations were concluded. On the last day of the tests, No. 2 unit was first placed in operation and run for a short time when No. 1 unit was placed in operation and subsequently both units operated simultaneously until the storage holder was filled. The overall operation of the units was satisfactory. The rate of make increased as the run progressed and reached 180 M cu. ft. per machine per hour when equilibrium conditions were reached prior to the end of the operating period. It is believed that a normal capacity of 4,000,000 cu. ft. of gas per day per machine under Denver conditions was established. The two units operated in phase relation without difficulty.

The results of test operations on June 6 follow:

Gas Made	665,000 Cu. Ft.
Heating Value (60°-30" Hg.)	
Specific Gravity	0.673
Oil Used Making Gas	9.950 Gals./MCF (60°-24.7" Hg.)
Oil Used Heating	1.008 Gals./MCF (60°-24.7" Hg.)

Oil Used
To-
tal .10.958 Gals./MCF (60°-24.7" Hg.)
Steam—Per MCF .....25 Lbs.

Conclusion—The foregoing summary briefly outlines the extent of operations carried out on the two eleven-foot water-gas sets converted to the refractory screen process. While the tests were not extensive or carried out over long periods of time, it is our opinion that sufficient work was done to establish the practicability of the process for emergency or standby service. Our interpretation of results leads to the following conclusions:

1. That a satisfactory substitute gas is produced for emergency utilization requirements.
2. That the generating units and auxiliary plant equipment can be placed in full operation by a crew of trained men in from three to five hours after call.
3. That the gas production capacity of the Denver units was established at approximately 4,000,000 cu. ft. per eleven-foot set per day.
4. On account of the deficiency of carbon that is retained on the refractory screen when cracked gas oil is used in the generator, it is desirable to provide a gas-making oil of 25°-30° Baumé which will contain 2 to 5 per cent Conradson carbon. This was provided in Denver by mixing a Bunker C fuel oil of 10°-12° Baumé with a 38° Baumé gas oil.
5. The fuel requirements of the Denver units were established at approximately 11 gallons per M cu. ft. of gas when using a 50% fuel-oil and 50% gas-oil mixture. Starting-up oil requirements were 600 to 800 gallons per generating unit from cold condition.

Summary of Gas Company Statistics For May 1933

REVENUES of the manufactured and natural gas industry aggregated $55,563,700 for May, 1933, as compared with $59,682,600 for May, 1932, a decline of 6.9 per cent.

The manufactured gas industry reported revenues of $32,204,800 for the month, a drop of 9 per cent from a year ago, while revenues of the natural gas industry totalled $23,358,900 or 3.9 per cent less than for May, 1932.

Sales of manufactured gas reported for May totalled 29,936,700,000 cubic feet, a decline of 6.3 per cent. Natural gas sales for the month amounted to 62,095,400,000 cubic feet, a figure approximately equal to the volume sold during the corresponding month a year ago.

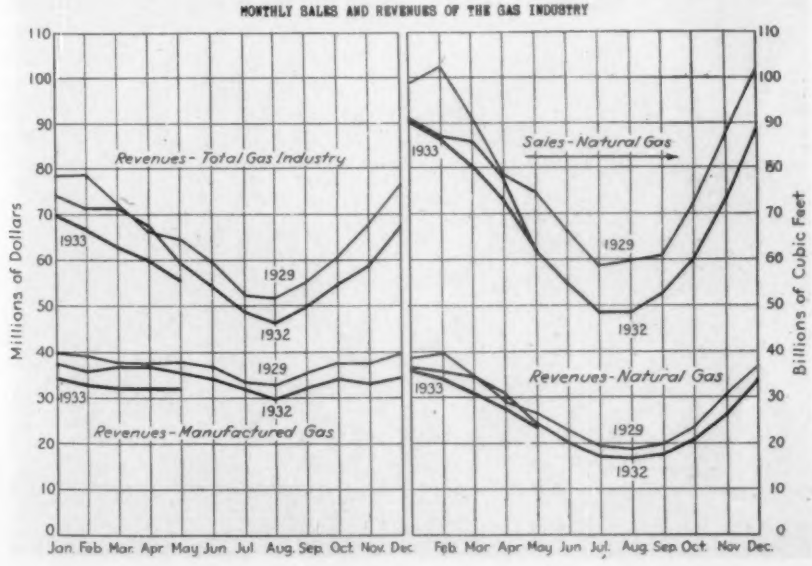
The relatively better showing of the natural gas companies was a result of a pronounced increase in sales to large scale industrial users. In May, 1932, sales for this purpose amounted to 8,115,300,000 cubic feet, but in May, 1933, rose to 9,088,500,000 cubic feet, a gain of 12 per cent.

This increase in industrial gas sales was prevalent in most natural gas territories, reflecting the pronounced gains in industrial activity and production registered during the month. In New York, sales of natural gas for industrial purposes increased more than 46 per cent, while in Ohio the gain in this class of business was nearly 27 per cent.

The mid-continent area also registered pronounced gains in industrial sales, the increase amounting to 12 per cent in Kansas and 9 per cent in Texas, while in Oklahoma ordinary industrial sales increased 26 per cent and sales to main line or large scale industrial users were up 47 per cent.

Paul Ryan, A.G.A. Statistician

MONTHLY SALES AND REVENUES OF THE GAS INDUSTRY


Millions of Dollars
Billions of Cubic Feet
Revenues - Total Gas Industry
1933
1929
1932
Revenues - Manufactured Gas
Sales - Natural Gas
Revenues - Natural Gas
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.

Evidence of Saleability of Gas Refrigerators

A TOTAL of 140,000 apartments which are equipped with automatic gas refrigerators are listed in the 1933 Apartment Directory recently issued by the Consolidated Gas Company of New York, and offered to the public in advance of the fall moving season.

This is an increase of 40,000 apartments over the number given in last year's Directory.

The new booklet lists 3,776 apartment buildings in Manhattan, Bronx and the first and fourth wards of Queens. Approximately 1,300 of the buildings are completely equipped with automatic gas refrigerators, and the remainder, a total of approximately 2,500 apartment dwellings, are partially equipped with gas refrigerators.

All of the buildings in the "completely equipped" classification are illustrated. Rental data, the number of rooms, and other information of interest to prospective tenants are given for most of the apartments listed.

Experiences With *Low Demand Water Heaters* in Boston

By D. S. REYNOLDS

Chief Engineer, Boston Consolidated Gas Co.

WE have made installations of several hundred of these heaters with very gratifying results. It is felt that this type of heater fills a distinct field, although it is by no means a complete solution of the water heating problem.

Our salesmen are thoroughly trained in analyzing the customer's hot water requirements and to be especially careful in recommending the proper size of heater.

The number of people in the family, the number of baths, showers, if any, whether there are young babies in the household, whether the laundry is done at home or sent out, and the time of day when the peak demand for hot water occurs, must all be taken into consideration in determining whether a low demand heater may be installed, and its proper size.

The great majority of low demand heaters sold by us are as replacements for tank heaters and boilers. As far as hot water service is concerned, even the smaller size (30 gallon) will render a more dependable hot water service than the old equipment, if it is sold with its limitations of recuperation thoroughly understood by the customer, so that he will learn how to adjust his foot water requirements to the heater, where necessary.

Leaky hot water fixtures should be repaired and made right. A leaky fixture can greatly increase the gas bill, as well as reduce the supply of hot water available in a storage system.

We recommend that hot water supply piping be covered with a good grade of medium temperature insulation.

Where possible, if ⅜" pipe is used for the hot water supply, a sufficient flow will be obtained, there will be less loss of heat from the pipe, and a shorter time will be required for hot water to flow after the faucet is opened.

Some Outstanding Sales Arguments for the Low Demand Heater

1. Our No. 7 promotional gas rate, gives a new low rate on all gas consumed, where an automatic heater was not in use previously.

2. The advantage of installing the heater in the cellar at the nearest point to the most used hot water outlet, since the 30 gallon size, at least, does not require a flue connection.

3. The fact that the thermostat can be easily adjusted to provide hotter water than is normally used for general use, on "wash-days" or other times when a larger quantity of hot water is required.

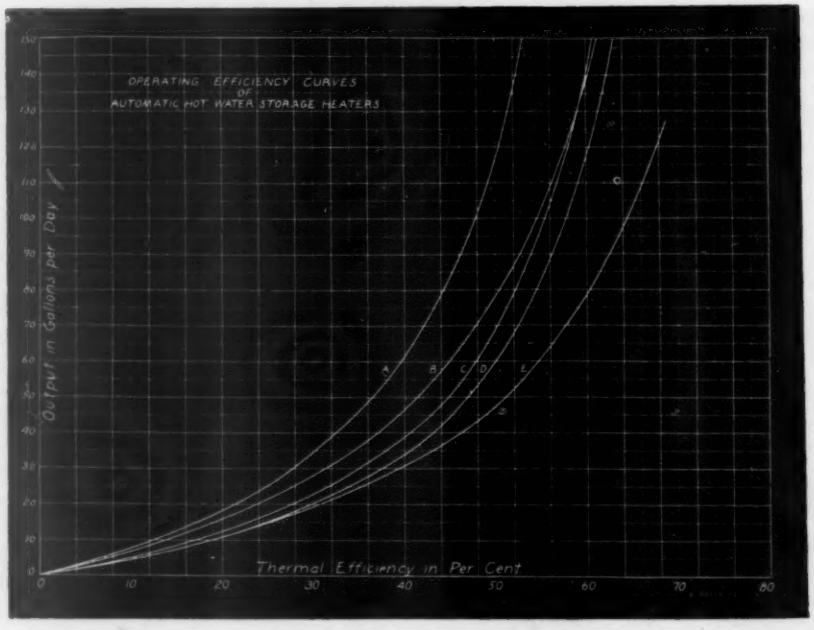
The Points That Appeal to the Customer

1. The idea of a guaranteed gas bill for hot water service. The salesman can show that if the heater were in operation 24 hours a day for a month, the gas consumption could not exceed a certain fixed amount.

2. The completely automatic features of the heater giving carefree hot water service at the minimum cost.

3. The appearance of the kitchen is improved by removing the kitchen boiler and tank heater and making the new installation in the cellar.

We have found that the customers who never had gas-fired heaters and those who have used tank heaters and who have learned how to use hot water without wasting, make very satisfactory customers for the low demand heater. They understand that several baths cannot be drawn in the morning and that the night



Read before Joint New York-New England Regional Gas Sales Conference, New London, Conn., June 22-24, 1933.

before "wash-day" the heater should be turned up to provide a tank full of hotter water by the next morning; in other words, they know how to adapt their requirements to the capacity of the heater.

The customer that is likely to have difficulty is one who has had an automatic, quick recovery heater, and who has been complaining about a high gas bill. This means that he has been using a great deal of hot water and it will be difficult to get such a customer to cut down on his use in order to have a low demand heater meet his requirements.

Of all the heaters we have installed only four or five have been removed, and in nearly every instance the customer was one who had been used to a quick recovery heater and was unable to adjust his use of hot water to the changed conditions.

Variation In Size of Heaters

The thirty gallon heater may be used in a single house with one bath and a family of three or four persons, and if the laundry is sent out, five or six persons can be supplied. On the other hand there are some homes with but two persons that it would be unwise to install a thirty-gallon, and in some instances even a fifty gallon would be insufficient.

The fifty gallon size is sometimes used for a home with two baths, and for a somewhat larger family than that in which the thirty gallon is recommended.

The average number of persons in the family served by the No. 30 Heater is 3.5, and in the case of the No. 50 Heater this figure is 5.2.

We have several No. 30 installations where five persons are satisfactorily served and instances where seven or eight are taken care of by the No. 50.

In some cases we have separate gas meters on these heaters.

One family, consisting of two adults and three children, has a No. 30 Heater and the average gas consumption per capita per month has been 650 cu. ft., and they report entire satisfaction.

In another instance a family of two adults, three children and two maids, in a large house with three baths, have consistently averaged 1100 cu. ft. per capita per month for over three years, and they also are very enthusiastic over the performance of the heater. Incidentally all the laundry of the family is done at home, the heater being turned up to its maximum on the night preceding "wash day".

One outstanding installation of a No. 50 Heater is in a very fine house where the family consists of a father, mother, four daughters, and a maid—a total of seven adults. Hot water is not used sparingly. Originally they had a side-arm automatic gas heater. The bills for hot water heating used to average eleven or twelve dollars per month. They were dissatisfied and proved easy customers for an electric salesman who installed an electric water heater. The electric rate for water heating was two cents per kw. h. The bills now averaged $18.00 per month and naturally the customer was more dissatisfied than ever. We were called back to see what we could do. A No. 50 Heater was substituted for the electric heater and the family were thoroughly posted on its limitations. After more than six months' use, the customer reports complete satisfaction with his hot water supply, and a monthly bill of $6.00 to $6.50. Naturally this customer is one of our biggest boosters.

Results of Study

A study was made of 215 installations out of the several hundreds that we have in use. Of these 90% were in single family houses and 9% in two family. A very few installations were made in three-family houses or in business places.

The 215 was made up of forty-five No. 50 and one hundred and seventy No. 30 Heaters.

It is interesting to see the types of hot water systems that were replaced by these low demand heaters.

Gas Storage Systems	17
Coal	16
Tank heater & boiler	152
Gas Instantaneous	16
Electric	1
New Installations	13
Making up the total of	215

Aver. gas cons. for 3 mo. before instal. No. 30 heater	3868 cu. ft. per mo.
Aver. gas cons. for 3 mo. after instal. No. 30 heater	6067 cu. ft. per mo.
Aver. increase in consumption	2199 cu. ft. per mo.
Aver. gas cons. for 3 mo. before instal. No. 50 heater	6277 cu. ft. per mo.
Aver. gas cons. for 3 mo. after instal. No. 50 heater	9731 cu. ft. per mo.
Aver. increase in consumption	3454 cu. ft. per mo.

On No. 30 Htrs. 12 instal. showed an aver. decrease of 783 cu. ft. per mon. On No. 50 Htrs. 4 instal. showed an aver. decrease of 800 cu. ft. per mo.

The average number of persons in the family served by the No. 30 Heater was 3.5, and the average served by the No. 50 Heater was 5.2.

Water Heating Costs

In Boston we have an optional rate, classification No. 7, for self-acting water heaters. Gas used for any purpose will be sold under this rate provided the customer uses an automatic self-acting gas heater to supply his hot water requirements.

Provided the bill is paid within fifteen days from billing date, the net rate is:

First 200 cu. ft. or less per mo.	$1.00
Next 2800 cu. ft. per mo. ...	.09 per 100 cu. ft.
Next 22,000 cu. ft. per mo. ...	.08 per 100 cu. ft.
Over 25,000 cu. ft. per mo. ...	.075 per 100 cu. ft.

The No. 1 rate which would be used in cases where there is no automatic gas heater, is .50 per month service charge and $1.00 per M for the gas.

Using the No. 7 rate, and the average consumption on No. 30 heaters, the total net monthly bill would be No. 5.97 or an average of a little under $1.00 per M. On the No. 50 heaters the net bill would be $8.90 or about .92 per M.

All water heaters sold by us must first be approved by the American Gas Association Laboratory. This means that requirements of minimum standards for safe operation, satisfactory performance, and substantial and durable construction have been complied with. How-

ever, the laboratory gives no information regarding the comparative operating efficiencies of the various water heaters.

We therefore test the various water heaters in our own laboratory to determine the operating efficiencies. We use a running water test where the inlet water is maintained at a temperature of 70 degrees F., within ± two degrees, and the outlet temperature at 140 degrees F. ± two degrees. The room temperature is maintained at 70 degrees F. ± two degrees. The "Thermal Efficiency" is determined with the heater operating at its maximum capacity.

"Recuperation Loss"

The "Recuperation Loss per Hour" is the heat lost when no water is withdrawn from the system.

If one heater has a higher thermal efficiency on a running water test and a lower recuperation loss on a standby test as compared with another heater, then the efficiency of the first heater will be higher throughout the entire operating range from zero gallons of water drawn up to the maximum output of the heater.

However, if one heater has a higher thermal efficiency at maximum capacity, but also a higher standby cost, then we have no means of determining which of the two systems is the most efficient throughout the normal operating range.

Table I has been prepared to show the data that has been obtained on five typical hot water storage systems from tests made in our laboratory.

The heaters have been lettered so that they can be discussed without mentioning the name of the heater.

E is the low demand heater.

Table I

	A	B	C	D	E
Flue Loss %	22.3	18.9	19.0	22.2	17.0
Thermal Eff. %	64.7	67.9	70.9	65.0	68.7
Rad. Losses %	13.0	13.3	10.1	12.8	14.3
Recup. Losses B.t.u./hr.	1,575	1,440	1,092	1,000	1,040
Input, B.t.u./hr.	24,300	9,000	25,000	7,000	4,500

Values from which operating efficiency curves were plotted were obtained by calculation as follows:

From *Table I* heater *A* has an input of 24,300 B.t.u. per hour, a thermal efficiency of 64.7 per cent and recuperation losses amounting to 1,575 B.t.u. per hour.

Assuming 30 gallons of water, raised 70 degrees F. are drawn in a 24-hour period, the output would be 17,500 B.t.u.

$30 \times 8.33 \times 70 = 17{,}500$ B.t.u.

The input to heat this amount of water would be

$$\frac{17{,}500}{.647} = 27{,}500 \text{ B.t.u.}$$

The burner would be "on" for 1.11 hours. $\frac{27{,}500}{24{,}300} = 1.11$ hours.

The heater would be "off" for 22.89 hours, and its total recuperation losses would be 36,050 B.t.u.

$22.89 \times 1575 = 36{,}050$ B.t.u.

The total heat consumed in 24 hours would be $27{,}050 + 36{,}050 = 63{,}100$ B.t.u. The operating efficiency for a 30 gallon draw therefore, would be 27.8 per cent.

$$\frac{17{,}500 \times 100}{63{,}100} = 27.8 \text{ per cent.}$$

In actual practice water is drawn intermittently according to the requirements of the consumer.

An Important Factor

In considering the "Operating Efficiency" at various daily withdrawal rates, the "Thermal Efficiency" and the "Recuperation Loss" per hour have been correlated.

The "Operating Efficiency" is the most important factor in the determination of the actual gas cost per gallon of water heated. The data show conclusively that the "Operating Efficiency" of the low demand heater is very high. This is due to the longer period of burning. The heater with the highest "Operating Efficiency", at the average daily withdrawal rate, will operate with the lowest cost per gallon of water drawn. It follows that the low demand heater should be very economical in operation.

The smallest heater that will handle any given requirements will have the highest operating efficiency and therefore the lowest operating cost.

As a general policy we try to restrict the sales of both the No. 30 and No. 50 Heaters to homes having but one bath. However, as pointed out previously, we have some exceptions to this rule that are giving entire satisfaction.

In some cases a customer having been influenced by our advertising of low cost hot water service, together with the low prices at which we sell low demand heaters, will insist on the installation of that type of heater, even though our experience indicates that it would be inadequate for his requirements.

In these cases notation is made on the order, that should the heater prove inadequate, it will be replaced by a specified quick recovery heater, the customer to pay the additional cost and the purchaser is required to sign this agreement.

Tests on Low Input Heaters

The New England Power Association made some tests on low input heaters at daily draw-off rates of 20, 30, and 75 gallons. The efficiencies obtained by them agree very well with our operating efficiency curves and give us a reasonable amount of faith in the values there presented.

Comparative tests made by them on other types of heaters at similar draw-off rates serve to emphasize our findings of the higher efficiencies of the low input heaters.

Using the "Operating Efficiency" curve E which is that of the low demand heater, it is possible to estimate what the probable monthly gas consumption for hot water will be.

The figures are based on a 30-day month, 535 B.t.u. gas, and a water temperature rise of 80 degrees F.

Table II

Gallons per Day	Monthly Eff.	Cu. Ft. gas per Gal.	Cu. Ft. per Month	Cu. Ft. Monthly Cost*	Cost per Gal. Cents
10	19.0	6.5	1950	$2.01	.670
20	31.0	4.0	2400	2.39	.398
30	39.6	3.14	2830	2.76	.307
40	46.2	2.69	3230	3.16	.263
50	51.2	2.43	3650	3.53	.235
60	54.8	2.26	4070	3.91	.217
70	57.6	2.17	4560	4.32	.206
80	60.4	2.07	4970	4.68	.195
90	62.5	2.00	5400	5.04	.187
100	64.4	1.93	5800	5.38	.179

** Monthly cost figured on Boston's No. 7 rate for automatic storage water heaters, and assumes 3000 cubic feet per month used for cooking and other purposes.*

Several homes where we have separate gas meters set on the 30

(Continued on page 14)

"Why Do People STOP And READ Window Displays?"

By STUART BRATESMAN

Manager, Display Dept.,
Boston Consolidated Gas Co.

THE answer to the question that forms the title of this article is this,—because there is something of interest shown in the windows that not only attracts, but holds, their attention.

Up to a few years ago window display advertising was considered an art that "just happened." By that, I mean it was generally believed that anyone with the average art school training could step in and swing the biggest display job in the entire gas industry. It has since been proven, especially to the officials of the larger companies, that modern window displays must be prepared with a thorough knowledge of human reactions, tastes, likes, dislikes and above all, a common sense attitude in reaching the man or woman on the sidewalk.

If you could take the time to "rubber-neck" beside every group of persons that stop and digest intelligently planned window advertisements you would soon learn of the things that appeal to the average person. It is the job of the successful display to reach out and arrest the attention of every "John Smith" and "Mary Jones" that passes your building. How can this be done? Let's consider a few simple psychological facts on human reactions to the average window display.

It's a well known fact that most people are more or less curious. It is up to us to arouse this curiosity, or interest, in some manner that will not only make the passerby stop and look at the advertisement, but actually read it. By far the most effective method of doing this, in today's window displays, centers around three important things; an original, attention-getting idea and headline,—brilliant colors that are in harmony with each other, but demand cognizance due to their smashing qualities,—and, last but not

least, an interesting treatment of the art work and lettering, having all the illustrations crisp and up-to-the-minute.

Our job would be comparatively easy if all we had to do to hold people's attention amounted to placing an appliance and a sign in the window. Arresting the public's attention requires a little more effort than that. Forceful window advertising compels the passerby to stop and read, and it is only beginning to show its actual worth in the industry. When we get back on our feet again the value of modern display work will be more and more considered from the angle of what it will do to stimulate sales. And where can this medium of advertising be found? It is interesting to note that all the big display departments have survived the depression, operating on greatly reduced budgets to be sure, but still constructively adding to the sales and good-will of the companies using display.

How about *your* window displays? Is there room for improvement? Utilize this effective medium, now, —and remember, window display advertising costs less to prepare than other forms of advertising and reaches everyone who passes your building twenty-four hours of the day and night.

Experiences With Low Demand Water Heaters

(Continued from page 12)

gallon water heaters show that the average use of gas per low demand heater, is between 3000 and 3200 cubic feet per month. This would seem to indicate that the average hot water consumption will be between 35 and 40 gallons per day in these homes. The monthly cost will average about $3.00.

In the larger families where the 50 gallon heater is installed there would be an average bill for hot water heating of $6.00 to $6.50 per month. This would correspond to a use of about 125 gallons per day.

If a bucket a day coal heater is compared with these costs, we find that .35 pounds of coal are required per gallon of water heated. Twelve hundred gallons per month would call for 420 pounds of coal. This figure is low, as the average use of coal is about 500 pounds per month. The cost for coal, even using only 420 pounds, $3.05, and the water delivered would be subject to very wide variations in temperature.

Where oil is the competitor, tests show that it takes about 0.0158 gallons of oil per gallon of water heated. For 1200 gallons per month the oil required would be about 19.0 gallons. The Automatic Oil Heater sells for about $160.00 as shown by Mr. Hall M. Henry.

The int. & depreciation at 10% makes a monthly cost of	$1.33
Gas Pilot 500 cubic feet @ $1.00	.50
Oil—19 gallons @ .07	1.33
	$3.16

As far as furnace coils are concerned, it is fairly well established that 20% of the fuel is used for water heating.

Taking an average house that would use 10 tons of coal a year at a cost of $145.00, 20% of this is $29.00 and as the heating season lasts eight months, $29 \div 8 = \$3.63$ per month, and in addition other means will have to be provided for furnishing hot water during the summer months.

Oil burner salesmen maintain that water may be heated with an indirect heater connected to the central heating boiler in the summer as well as during the heating season. Again using Mr. Henry's figures we will investigate the cost of heating 1200 gallons of water with oil in such an installation:

	Summer Monthly Costs	Winter Monthly Costs
Cost of fuel 24 gal. @ 7c	1.68	1.68
Cost of elec. @ $.06 per Kw.Hr.	.30	.30
Depreciation (300.00-56 months)	5.36	—*
Extra Servicing (10.00-8 months)	1.25	—*
Int. & depreciation on extra investment $\frac{\$150 \times 10\%}{12}$	1.25	1.25
Total	$9.84	$3.23

** No extra cost because burner is being operated to heat house.*

Average monthly cost (12 months)

$$\frac{4 \times 9.84 - 8 \times 3.23}{12} = \$5.43$$

If a gas ignition is used instead of electric, the monthly cost will be somewhat greater. As far as electricity is concerned, the lowest rate available for water heating in our territory is not such as to afford any serious competition.

In making a fair comparison of relative costs of water heating the interest and depreciation on the gas heater should of course, be included, but I think the brief comparisons above show that gas is in a rather favorable position when we consider the cleanliness and superior, carefree service that is enjoyed by its use.

As far as servicing is concerned, we have not had this type of heater on our lines for a long enough time to make exact comparisons, but from the remarkably little trouble we have had with those installed, we are reasonably certain that the servicing will be very small.

Reason For Calls

Most of the comparatively few calls we have had, have been due to a heater being overdrawn and the resulting condensation of the flue-products. In most instances the customer was instructed in how to use the heater and satisfaction resulted. Other calls have been because a pilot has been too low or too high.

In conclusion we feel that it is a distinct advantage to our company to sell the Low Demand Heater.

It overcomes the sales resistance to a possible large gas bill, by allowing us to practically guarantee that the maximum bill will never exceed a certain amount.

It enables us to reach a class of customers that would otherwise be unattainable.

Its low servicing cost recommends it most highly, both to the customer as well as to the company.

The average increase in monthly gas bill of about 2200 cubic feet on a No. 30 Heater, where gas had been used before, and at least 50% more where a No. 50 is installed, makes a very attractive proposition when we consider the large number of customers on our lines who now use either a tank heater or else no gas for water heating.

To The End That The Gas Industry *Will Take Its Place In The Sun*

Recommendations Presented Before the Executive Conference, American Gas Association, by W. A. Gilman, Vice-President, N. W. Ayer and Son—the same being the results of a study of the sales and advertising needs of the gas industry sponsored by the National Directing Committee of Executives

1. The Readjustment of Retail and Wholesale Appliance Prices to Make Possible the Conduct of Sales Promotional Activities on a Sound Economic Basis:

Retail prices should be raised because gas appliances in their own right are worth more than the average utility gets for them.

Such elevation in the price of gas appliances will create more favorable opinion toward them on a comparative basis with other appliances. Even with this elevation, gas appliances will still have an adequate price advantage over competition.

Readjustment of prices will be a stabilizing influence in each utility's community.

An increase in wholesale prices will allow manufacturers sufficient margin to make a profit, to constantly improve their products, and in many cases promote them with the public. Competitive fields include many strong manufacturers who through their sales promotional work and advertising have benefitted their industries. We believe this recommendation would assist the gas industry along similar lines.

Increased prices will permit the utilities to improve the caliber of their personnel.

Increased prices will permit the utilities to be better merchandisers and will make it possible to secure greater cooperation from plumbers and all other retail outlets because it will give the latter a greater margin on the sale of gas appliances.

2. Rates of a "Promotional" or "Inducement" Character Based on Local Conditions:

Further development in "promotional" or "inducement" rates must take place if the industry is to secure the load that it deserves.

The determination of the rate should be based upon a complete analysis of the competitive situation. The American Gas Association is preparing to supply each utility with a form on which all information pertinent to sales prices of other fuels and appliances can be tabulated and analyzed.

3. Systematic, Concentrated Training of Sales Forces to Increase Efficiency and Reduce Turnover:

It is important that sales forces be trained to sell in terms of human values instead of mechanics and engineering. The progressive utilities are developing their own sales training plans, but a number of utilities are not using any.

The American Gas Association provides complete courses for the better selling of each appliance. We do not find that they are being used to the extent they deserve.

Turnover in sales organization is expensive. In our survey we found

sales organizations which turned over in as brief a period as sixty days. Such an uneconomical procedure would not occur with a well-trained sales force.

Slide films are recommended for:

a. *The education of salesmen, plumbers and dealers.*

This form of training is increasing in popularity because it presents the story pictorially—hence more interestingly. A number of utilities are using slide films with their sales forces because they find the training period is materially reduced. Life insurance companies, automobile manufacturers, electrical refrigerator people, and many others, use them effectively.

Several utilities—during our survey—said they would like to have these films.

b. *The actual closing of sales.*

Films provide a salesman with a tailor-made sales presentation which he must give in an orderly manner. One utility reports 60% of its appliance sales made through the use of slide films in evening selling.

The advantages and superiorities of gas as a fuel can be graphically presented in slide film form through the medium of modern up-to-date gas appliances.

4. Readjustment of Compensation to Secure More Earnest Effort from the Sales Force and to Prevent Conflict Between Salesmen's Efforts and Those of Plumbers and Other Retail Outlets:

The selling of gas appliances—or any other commodity—effectively, requires good men. To secure and hold good men means that they should be adequately paid. It will not be necessary to start men off at high salaries under present conditions of the industry, but this makes it all the more

important to give them incentive by offering the opportunity to increase their earnings through adjusted and increasing compensation.

For instance, a quota can be set which will approximate previous sales and minimum volume required. On this the previous form of compensation can be continued. On all additional volume an increasing percentage can be added to the compensation so that with every increasing step in volume a salesman continually earns more, while the utility's selling cost is decreased.

A salesman's override for merchandise sold by plumbers and dealers would probably eliminate conflict of interest between a dealer and utility salesman in the sale of appliances and establish confidence in the dealers to the extent that they would call in the utility representative to help them in the closing of difficult sales.

5. The Determination of a Planned and Systematic Sales Program Covering the Entire Year:

We recommend this because of the uniform, directed effort it should insure. Many utilities print monthly sales programs which are given to their sales forces and their dealers. The majority have none.

Careful selection must be made of the appliances to be pushed during seasonal drives.

We recommend that strong emphasis be placed on the fully automatic range, not only because of its potential sales volume but because of its symbolic significance to the industry. Also because it is necessary to get these into the field in order to still further perfect this type of appliance.

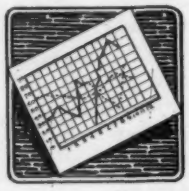
There are indications of certain companies feeling that gas refrigeration should not be pushed because of the limited load that it brings. Others feel that the market for house heating is so limited as not to warrant very active promotion and advertising support.

A gas refrigerator in the kitchen strengthens very materially the consumer's consciousness of gas and the service it renders.

Whereas electric appliances are generally regarded as more modern than gas appliances in the mind of the consumer, gas house heating holds top position in its field. It is a standard-bearer in keeping the idea of gas as a modern fuel uppermost in the public's mind.

Gas house heating and gas refrigeration should be promoted because of the significance of these appliances to the consumer as well as to the gas load.

The utility's sales records will determine the seasons of the year during which each major line of appliance moves best, and the seasonal drives should be built on that information.



The type of appliance to be featured should be determined through surveys which will disclose the satisfaction rendered by each. Successful sales results from distribution of appliances best calculated to give satisfaction to the consumer. It is of the utmost importance that the gas industry be fully acquainted with its customers' reactions to every type of appliance it distributes if a skillful and effective job of sales promotion is to be done.

One company made a survey of 350 limited demand water heater users and found 94% satisfaction, but confirmed their ideas on the type of customer to whom this appliance would not give full satisfaction. Another reports that six out of eight domestic users in its territory have automatic storage water heaters because they studied the market to see what the public needed, then featured and emphasized this appliance in all their sales, advertising and promotion work.

All too few companies are gearing their sales effort on appliances that give satisfaction—many of them, in their replies to our question on this point, indicated that their thoughts are only of the gas load.

6. The Planning of Local Advertising to Present Constructive Salesminded Messages of Interest to the Consumers, Instead of the Average Listing of Equipment and Prices:

The majority of local utility newspaper advertising is simply an illustration of equipment and listing of prices. It is lacking in the imaginative qualities necessary to present gas and gas appliances to the consumers in terms of benefit and value.

Some of this advertising indicates that in many localities the utility has been manoeuvered into a place where it can no longer maintain its position in serving the community but is forced to compete on a price basis with gyps.

Some of the advertising appears to have been run for political reasons rather than good-will or appliance sales. We believe the proper organizing of the advertising would remedy this situation to a large degree.

There is no doubt that some utilities are badly in need of assistance in art work, layout suggestions, and basic copy which can be locally adapted.

One utility which recently revamped its complete advertising program received letters from five other gas companies asking for an outline of the plan and how to apply it. This indicates definitely that many utilities want help in planning their advertising so as to provide it with a basic theme as well as physical improvement.

On the other hand, some of the advertising is good and tells the story of gas and gas appliances adequately.

7. The Development of a Personality Around the Utility and Its Personnel for Use in Constructing News Articles That Will More Definitely Establish the Utility as a Servant of the Community:

The policy of many utilities is against permitting the name of the company or members of the organization to be used in local news items or releases. We believe this is wrong. The utility is the servant of the community and as such the activities of its personnel and its services to the community are of news interest. This does not mean that newspapers will print stories of inter-organization incidents and happenings but they will print items that are of interest to the community in general.

Many utilities are engaged in local work, such as Welfare Drives, Renovation movements, etc., without getting credit. To secure credit frequently means using the name of an individual in the utility, but we feel that such individuals should subordinate their personal preferences for the sake of getting the names of their companies into print in such fashion as to put the utility on a

more human and friendly basis with its customers.

8. The Arrangement of Meetings with Plumbers, Department Stores, Mail Order Houses, Furniture Stores, for the Organization of Merchandising Drives; These Meetings Being Planned to Put Plumbers and Dealers to Work in the True Meaning of the Word:

It will be obvious that constantly recurrent meetings will be of value to the industry if interest can be given to them. They can be started for the purpose of disseminating information regarding products, prices, and promotional features in connection with seasonal drives.

They can be continued for the purpose of checking on the progress of these drives. They can grow into regular meetings at stated intervals in which we see the possibility of developing local organizations—the Gas Guild, the Gas Institute, etc. Thus, the majority of factors concerned with the sale and maintenance of gas and gas appliances in any community can be brought together for organized concerted effort.

9. The Development of a Plan, Giving Plumbers Connection Work on Appliances Sold, the Distribution of This Work on Sales by Utilities and Other Outlets to Be According to the Plumbers' Own Sales Performances:

This is a plan we find being successfully used by ten of the utilities we have studied. It commends itself to us because it gives plumbers dollars and cents incentive to work with the utility. It is one of the means to weld the whole selling organization in a community into one unit.

Obviously, this recommendation will need local application because of varying conditions. This applies particularly to house heating.

10. The Organization of Special Drives:—Briefly, These Should Include:

a. Dealer meetings.

b. Specific assignment of responsibilities to everyone present at the meeting.

c. Special dealer displays.

We find several companies working effectively with plumbers in window and floor displays. Generally, the utility offers all available help in this connection. Since, through our investigation, we find a great number of utilities doing splendid window and floor display work, it is obvious that the whole tone and character of plumbers' shops can be graded up through this type of assistance.

d. Special floor displays in department stores, etc.

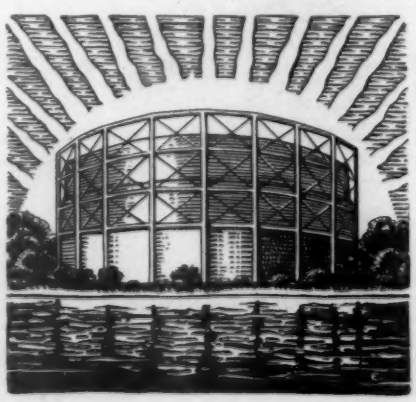
Several companies have been successful in getting local department stores to cooperate with them through the installation of model gas kitchens. In two cases, the department store has advertised this kitchen and invited people to see it. One of these department stores included advertising on gas refrigerators and ranges with the invitation to the gas kitchen and reports that it enjoyed the greatest day in the sale of gas ranges in its history.

e. Special tie-in advertising by plumbers, dealers, etc.

It is highly important that the industry make determined effort to secure cooperative advertising from its dealers. Any food or drug manufacturer can secure advertising for his products from grocers or druggists in almost any community. Certainly, gas appliances are deserving of the same support. Such advertising will greatly increase the pressure upon the consumer, without increasing the burden on the utility.

f. Special direct-mail campaign, to be undertaken by plumbers and dealers on their own prospects, and material provided by utility.

Plumbers generally are not regarded as merchandisers. It is within the power of the utility to help them become merchandisers. One avenue is the development of mailing lists for which the utility would supply literature. The utility should insist that the plumber or dealer have such a mailing list whether the utility handles the mailing or not.



g. Special promotion work by home service departments with cooking schools in newspapers, the home economic classes in schools, women's clubs, etc.

The majority of utilities have a home service department. In some instances the work of these departments is productive of a great deal of newspaper cooperation, especially in connection with cooking schools, and resultant favorable news releases for the utility.

h. Cooperation of home service department with aggressive plumbers and dealers for work on their prospects.

Some utilities plan the home service department for specific and direct assistance to plumbers, dealers, during cooking school and special demonstrations held in the plumbers' stores. They also make the home service department available for calls on plumbers' prospects to assist in closing sales.

11. The Training of the Entire Personnel of the Utility for the Promotion of Gas and Gas Appliances:

The training of the entire personnel of the utility is one of the most important possibilities in increasing volume of sales for the industry. It is one which, according to our survey, has been overlooked though many companies report remarkable results from the use of sales plans in which bonuses for leads, etc., are offered.

One company attributes 23% of sales to leads furnished by 30% of the employees. Another reports 43% of all appliances sold in 1932 as coming from leads of employees.

One utility reports that 80% of its entire organization personnel volunteered for and are attending educational courses in which slide films are used.

The American Gas Association provides a course in gas cooking, for training the utilities' entire employee personnel. We strongly recommend that this course and others to follow be utilized by the local utilities.

12. A Survey of Gas Consumed by Customers Who Have Purchased New Appliances Within the Last Year, to Prove Increased Load:

This recommendation is made in order that executives of utilities may prove to themselves the load-build-

ing advantages to be gained through the sale of modern gas appliances. Survey of one company showed an increase of 6.3% in gas used by 540 customers on its mains through use of a new gas range. Five other companies on our recommendation are making such a survey.

13. The Setting Up of a Kitchen Styling Service to Be Used Not Only for Individual Prospects, But With Speculative Builders, Architects, Engineers and Building Owners in Modernization Programs, Etc.

A service of this scope and impressiveness will do a great deal toward changing the conception of the gas company as a public servant. It is one means of creating a personality for news publicity. Kitchen styling service with laundry and basement planning can be the vehicle for the promotion of all gas appliances and resultant building of load.

Such a service can be administered by members of the present staff of any utility supported by the facilities now being arranged by the American Gas Association. Kitchen styling service can be symbolic of the gas industry.

Five utility companies have already done considerable work in designing and re-designing kitchens. This has brought them in contact with speculative builders, architects, engineers, and building owners in modernization programs.

Twenty-three utilities were requested to supply photographs of kitchens in their territories that should be modernized. We received approximately sixty showing kitchens that are badly in need of modernization. They are now gas kitchens. They should be modernized as gas kitchens.

The utility should realize it may be difficult to sell a woman another range when she already has cooking equipment that apparently works, but it is comparatively easy to sell her on improving the efficiency of her kitchen.

14. A Comprehensive Survey by the Utility of All Gas Equipment on Its Mains, Whether in Use or Not, and of All Competitive Equipment in the Homes of Customers; This to Be Used for the Development of Constantly Better Organized Sales Management and Effort:

Intelligent sales promotion is based on a thorough knowledge of the market. No utility can expect to promote its sales efficiently without knowing where appliances can be sold or the condition of appliances in the homes of its customers. Information regarding competitive appliances in the home is an important guide in sales promotion.

From the few surveys which utilities have made—as developed by our study—the replacement possibilities in ranges are tremendous. It is up to the gas industry to do the replacement if other industries are not to do it.

We realize that is a big order and should take probably a year or two in any case, but it certainly should be started.

We cannot impress too forcibly upon the National Directing Committee its responsibility in securing the whole-hearted cooperation of the executives of each gas utility of the country in connection with this program. Without their courage, vision and active help these sales and advertising recommendations cannot succeed.

The gas industry needs national advertising. We believe the recommendations of this program are sound, reasonable and relatively simple of accomplishment, if every one in the industry will get behind the program.

Heating the Unheatable

DURING an Automobile Show in Portland, Oregon, the enormous hall was comfortably heated by Gas, although it had been predicted, on account of its construction and enormous space, the place would not be heatable.

The size of the building is 200 x 260 feet and the ceilings are 20 feet high.

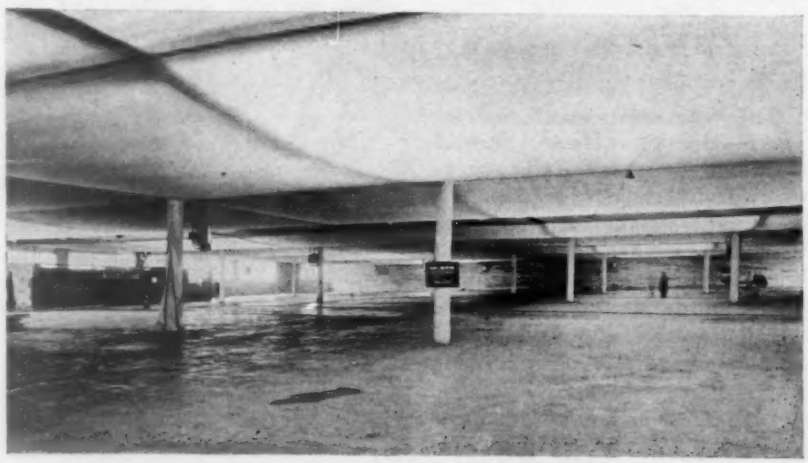
Fifteen #100 Humphrey Unit Heaters of the factory forced-air circulating type were used in the hope of satisfactorily solving this heating problem and the heaters more than made good the sponsors' expectations, as witnessed by your correspondent, who noticed particularly that the young lady attendants took evident pleasure in taking a warm-air "dry-shower" under the Unit Heater fan, reminding them probably of the hair-dryers at swimming pools!

It took 1,500 feet of piping to make the installation and the total Gas consumption was over 2,000 cubic feet per hour.

The heaters were suspended from the roof beams, thus causing no encroachment on the valuable and needed floor-space.

While the Gas Company officials admitted the installation to be of little value from a direct consumption-profit standpoint, nevertheless as an advertiser of the wonderful advantages and flexibility of gas-heating, the effort was undoubtedly worth several times its cost, as large signs informed the thousands of visitors, how this barny building was made so comfortable.

—O. B. Server.



ELEMENTS OF GAS TECHNOLOGY

Combustion of Gases and Manufacture of Commercial Gases

THE net hydrogen in a fuel is the excess hydrogen over and above that which can combine with the oxygen present, and this may also be calculated from the flue gas analysis alone. The available oxygen is used to burn carbon and hydrogen, the excess appearing in the flue gas analysis as free O_2. The water formed by the combustion of the net hydrogen naturally does not appear in the analysis, being condensed during the process of analysis, and therefore it must be determined by computation. The oxygen balance offers the means of doing this. In the foregoing example (see page 25, July issue), the total O_2 corresponding to 83.4 mols N_2 is equal to $\frac{83.4}{.79}$ — 83.4 = 22.17 mols O_2, of which 5.5 + 11.1 or 16.6 mols appeared in the flue gas as CO_2 and free O_2. Then 22.17 — 16.6 = 5.57 mols O_2, which is equivalent to 2 × 5.57 or 11.1 mols H_2O or H_2, since ½ mol of O_2 is equivalent to 1 mol of H_2O or H_2, according to the reaction.

$$H + \tfrac{1}{2}O_2 = H_2O$$

This means that 11.1 mols H_2O (or H_2) were formed for each 100 mols of flue gas, and as there were 5.5 mols of carbon per 100 mols of flue gas, the ratio of the net hydrogen to carbon in the *fuel* gas is $\frac{11.1}{5.5}$ or 2 mols H_2 per mol of C.

MOISTURE IN THE FLUE GAS—The total amount of water present in the flue gas is the sum of the water originally present in the fuel as vapor or in chemical combination, plus water from combustion of hydrogen, plus moisture in the air. When the analysis of the fuel is known, the water in the flue gas may be calculated directly, disregarding the moisture in the air. In the case of dry CH_4, the volume of H_2O vapor would be 2 mols per mol of flue gas. Since there were 18.2 mols of flue gas formed per mol of CH_4 used, there would be $\frac{2}{18.2} \times 100$ or 11.1 mols of H_2O formed per 100 mols of *dry* flue gas. Therefore 100 volumes (or cu. ft.) of *dry* flue gas would correspond to 111 volumes (or cu. ft.) of wet flue gas. It will be noted that this agrees with the amount calculated in the preceding paragraphs, from an analysis of the flue gas, since there was no O_2 present in the original fuel. If the analysis of the fuel is not known, the water vapor from the combustion of the net hydrogen alone may be determined from the flue gas analysis. This is sufficiently accurate for most purposes, as the net hydrogen seldom constitutes a very large proportion of the total hydrogen, and furthermore, the accuracy of the analysis of both solid fuels and gaseous fuels for H_2 and O_2 is quite susceptible to error.

Table 10 gives air requirements and combustion products for various gases.

Manufacture of Commercial Gases

PRODUCER GAS—Producer Gas is made by blowing a mixture of air and steam, and sometimes air alone, through a thick hot bed of coal or coke. In American practice steam is always used with the air, but in other parts of the world producer gas is still made with air alone, in which case it is generally known as Siemens gas. The invention of gas producers dates back to 1832 and is credited to Faur. Very little improvement was accomplished until 1861, when Siemens made further developments in producer design in connection with the invention of the open-hearth furnace. Figure 3 is a diagrammatic representation of a simple form of gas producer.

Fuel, in the form of coal, coke or charcoal, is fed through a hopper into a brick-lined chamber, and ignited. A mixture of air and steam is blown through the bed of the fire from below, and the gas, consisting of CO and H_2, together with the tar, the volatile constituents of the fuel, the nitrogen from the air, and particles of unburned carbon, passes out through a discharge main near the top. Producer gas can be very cheaply made, and as it possesses, in general, all of the advantages of other gaseous fuels, it finds ready application in many branches of industry. Haslam and Russell state that there is an estimated total of approximately 11,000 gas producers in use in the United States, distributed as follows: Steel industry, 59.1%; glass industry, 13.6%; ceramics and lime-burning, 13.6%; power generation, 9.1%; other metallurgical and chemical fields, 4.6%.

TABLE 10

Air Requirements and Combustion Products of Gases

GAS	Formula	Cubic Feet per Cubic Foot of Combustible: Required for Combustion O_2	N_2	Air	Flue Products H_2O	CO_2	N_2	Pounds per Pound of Combustible: Required for Combustion O_2	N_2	Air	Flue Products H_2O	CO_2	N_2
Hydrogen	H_2	0.5	1.882	2.382	1.0	..	1.882	7.939	26.414	34.353	8.939	....	26.414
Carbon Monoxide	CO	0.5	1.882	2.382	..	1.0	1.882	.571	1.900	2.471	....	1.571	1.900
Methane	CH_4	2.0	7.528	9.528	2.0	1.0	7.528	3.992	13.282	17.274	2.248	2.745	13.282
Ethane	C_2H_6	3.5	13.175	16.675	3.0	2.0	13.175	3.728	12.404	16.132	1.799	2.929	12.404
Propane	C_3H_8	5.0	18.821	23.821	4.0	3.0	18.821	3.631	12.081	15.712	1.635	2.996	12.081
Iso-Butane	C_4H_{10}	6.5	24.467	30.967	5.0	4.0	24.467	3.581	11.914	15.495	1.551	3.030	11.914
n-Butane	C_4H_{10}	6.5	24.467	30.967	5.0	4.0	24.467	3.581	11.914	15.495	1.551	3.030	11.914
n-Pentane	C_5H_{12}	8.0	30.114	38.114	6.0	5.0	30.114	3.551	11.815	15.366	1.499	3.052	11.815
n-Hexane	C_6H_{14}	9.5	35.760	45.260	7.0	6.0	35.760	3.530	11.745	15.275	1.465	3.067	11.745
Ethylene	C_2H_4	3.0	11.293	14.293	2.0	2.0	11.293	3.425	11.395	14.820	1.285	3.139	11.395
Propylene	C_3H_6	4.5	16.939	21.439	3.0	3.0	16.939	3.425	11.395	14.820	1.285	3.139	11.395
Butylene	C_4H_8	6.0	22.585	28.585	4.0	4.0	22.585	3.425	11.395	14.820	1.285	3.139	11.395
Acetylene	C_2H_2	2.5	9.411	11.911	1.0	2.0	9.411	3.075	10.231	13.306	0.692	3.383	10.231
Benzene	C_6H_6	7.5	28.232	35.732	3.0	6.0	28.232	3.075	10.231	13.306	0.692	3.383	10.231
Toluene	C_7H_8	9.0	33.878	42.878	4.0	7.0	33.878	3.128	10.407	13.535	0.783	3.346	10.407
Xylene	C_8H_{10}	10.5	39.524	50.024	5.0	8.0	39.524	3.168	10.540	13.708	0.849	3.318	10.540
Naphthalene	$C_{10}H_8$	12.0	45.170	57.170	4.0	10.0	45.170	2.999	9.978	12.977	0.563	3.436	9.978
Hydrogen Sulphide	H_2S	1.5	5.646	7.146	1.0	SO_2 1.0	5.646	1.408	4.685	6.093	0.529	SO_2 1.880	4.685
SOLID													
Carbon to CO_2	C	..	.....	.....	..	..	.....	2.667	8.873	11.540	....	3.667	8.873
Carbon to CO	C	..	.....	.....	..	..	.....	1.333	4.437	5.770		CO=2.333	4.437

When air alone is forced up through the incandescent fuel in the producer, the oxygen unites with the hot carbon to form first, CO_2, which is in part reduced immediately afterward to CO, in accordance with the fundamental reactions.

$$C + O_2 + 3.76\ N_2 = CO_2 + 3.76\ N_2 + 169{,}686 \text{ B.t.u.}$$
$$C + CO_2 + 3.76\ N_2 = 2CO + 3.76\ N_2 - 74{,}970 \text{ B.t.u.}$$

The first reaction is exothermic, that is, heat is evolved; the second one is endothermic, heat being absorbed. Naturally, the thicker the bed of the fuel, the more CO_2 is reduced to CO, the gas approaching an ideal composition of 34.7% CO and 65.3% N_2 and having a calorific value of 110 B.t.u. per cu. ft. at 60° F., saturated.

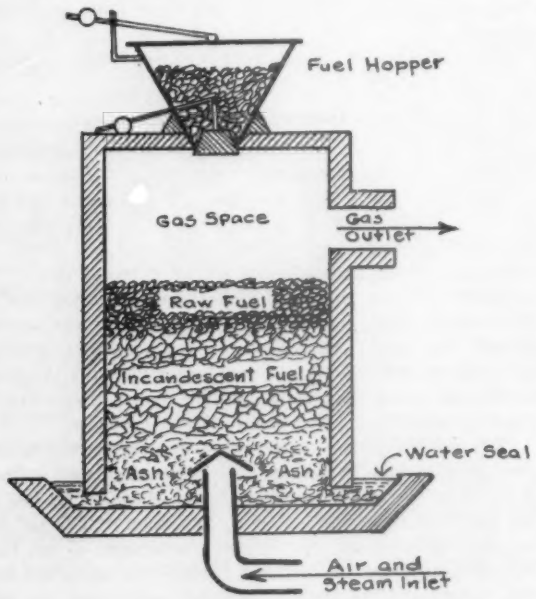


Fig. 3 – Simple Gas Producer.

The heat developed by the first reaction appears partly as sensible heat in the gas, the balance being lost by radiation, heat in the ash, etc. The potential heat in the CO gas, or in other words, the heat available through combustion of the CO, is given by the equation

$$(2CO + 3.76\ N_2) + (O_2 + 3.76\ N_2) = 2CO_2 + 7.52\ N_2 + 244{,}656 \text{ B.t.u.}$$

Producer gas + Secondary air = Stack gas + Heat

The heat input, obtained by the complete combustion of 2 mols of carbon, is $2 \times 12 \times 14{,}140 = 339{,}360$ B.t.u. The sensible heat in the gas above 60° F., assuming an outlet temperature of 1600° F., can be shown to be approximately 65,700 B.t.u. for the number of mols of gas formed by the foregoing reactions. Adding the values for potential heat and sensible heat, namely 244,656 B.t.u. and 65,700 B.t.u., the total heat accounted for is 310,356 B.t.u., and subtracting this from the available heat in the carbon, 339,360 B.t.u., the remainder, 29,004 B.t.u., is the heat lost by radiation and in the ash, etc. The foregoing performance is what is known as an approximate heat balance.

The efficiency of a gas producer can be stated in two ways: if the sensible heat can be applied usefully, the efficiency is known as the *hot efficiency;* if the sensible heat is lost by reason of having to pass the gas through scrubbers, etc., or by passing through long transmission lines, then the efficiency is known as the *cold* efficiency.

In the case just cited, the hot efficiency, assuming all of the sensible heat to be utilized, is

$$\frac{\text{Potential Heat} + \text{Sensible Heat}}{\text{Total Heat}} = \frac{244{,}656 + 65{,}700}{333{,}360} = .91$$

The cold efficiency is $\frac{244{,}656}{339{,}360} = .72$. This is the theoretical maximum, and, of course, is never obtained in practice.

GAS SPACE Heat Value Diminishes due to dilution, etc.
DISTILLATION ZONE Gaseous Hydrocarbons in Fuel, if any, added to gas; formation of Coke.
SECONDARY REDUCTION ZONE Further Reduction of CO_2 to CO; slight reduction of H_2O by CO; fuel preheated by hot gas. $C + CO_2 = 2CO$ $CO + H_2O = CO_2 + H_2$
PRIMARY REDUCTION ZONE Reduction of CO_2 to CO and decomposition of Steam by hot Carbon, heat absorbed $C + H_2O = CO + H_2$ $C + 2H_2O = CO_2 + 2H_2$ $C + CO_2 = 2CO$
OXIDATION ZONE Combustion of Carbon to form CO_2; Heat Produced. $C + O_2 = CO_2$
ASH ZONE Ash cooled and Air-Steam Blast preheated

Fig. 4.—Zones of Reaction in Gas Producers.

There are good reasons why the air-blown producer is not more widely used:

1—The heating value can not exceed 110 B.t.u. per cu. ft.

2—The cold efficiency is low and much of the heat in the coal is transformed into sensible heat in the gas.

3—Operation is intermittent, due to excessive formation of clinkers. This causes blow-holes in the fuel bed.

The above reasons led to the substitution of steam for a part of the air. Steam reacts with hot carbon according to the equation

$$C + H_2O = CO + H_2 - 56{,}718 \text{ B.t.u.}$$
(H_2O considered as gas)

By the use of steam, there is no additional nitrogen to dilute the gas; on the contrary, both the CO and H_2 formed are combustible, and add appreciably to the heat value of the resultant gas. Steam is usually available in quantity in most industrial plants and hence there is no additional investment required.

The gas produced by the blowing of steam through incandescent carbon is known as water gas, and has a heat value of about 300 B.t.u. per cu. ft. The product resulting from a mixture of air and steam blowing through a hot fuel bed will range from 130 to 180 B.t.u. per cu. ft. Further, the reaction is endothermic, and some of the sensible heat available is thus converted into potential heat which is utilized when the gas is finally burned. The cold efficiency of the producer is therefore increased and the absorption of heat by the reaction between C and H_2O has the very important effect of reducing clinker formation to a minimum.

Limits of Inflammability of Natural Gases Containing High Percentages of Carbon Dioxide and Nitrogen

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(Continued from July issue)

Calculation of Inflammable Limits

THE calculation of the limits of inflammability of natural gas containing nitrogen and carbon dioxide, or both is made in the following manner.

Use is made of Le Chatelier's law, which in its simplest form is stated as follows:

$$\text{Limit} = \frac{100}{\frac{P_1}{N_1} + \frac{P_2}{N_2} + \frac{P_3}{N_3} \ldots}$$

in which P_1, P_2, and P_3 ... are the proportions of combustible gas present in the original air-free mixture, so that

$$P_1, P_2, P_3 \ldots = 100$$

and N_1, N_2, and N_3 are the limits in air for each combustible gas.

If for P_1, P_2, and P_3 in the above equation there is substituted the "total per cent of component" and for N_1, N_2, and N_3 the "limits of component", then the equation may be used for calculating the limits of inflammability of methane, ethane, propane, butane, carbon dioxide, and nitrogen by combining the data for the nitrogen and carbon dioxide with that of the different combustibles.

As an example, consider a natural gas containing both carbon dioxide and nitrogen in rather high percentages.

Table 9.—Limits of Inflammability of Methane, Ethane, Nitrogen, and Carbon Dioxide Mixtures

1	2	3	4	5	6
Composition of original mixture air-free basis, percent by volume	Mixtures divided into two component mixtures as follows	Ratio of nitrogen or carbon dioxide to combustible	Total per cent of components	Limits from Tables 1, 2, 3, and 4	
				Lower	Upper
Methane ..... 40.6 Ethane ..... 7.6 Carbon dioxide. 24.2 Nitrogen 27.6	Methane ..... 4.6 Carbon dioxide. 24.2 Ethane ..... 7.6 Nitrogen 27.6	0.60 3.63	64.8 35.2	8.5 14.6	19.0 32.1
Total 100.0	100.0		100.0		
or	Methane ..... 40.6 Nitrogen ..... 27.6 Ethane ..... 7.6 Carbon dioxide. 24.2	0.68 3.18	68.2 31.8	8.4 13.6	20.8 27.9

Composition of Natural Gas

Constituents	Per cent by volume
Methane	40.6
Ethane	7.6
Carbon dioxide	24.2
Nitrogen	27.6
Total	100.0

For the purpose of calculation, the data for the nitrogen and carbon dioxide may be combined with that for the methane and ethane in the following manner:

The combining may be done in other ways not given in the above example; it is only necessary to combine the nitrogen and carbon dioxide with the combustibles in such proportions that the components have inflammable limits and, further, that all the nitrogen and carbon dioxide in the sample is combined with the different combustibles.

The limits can now be calculated directly from the values given in columns 4, 5, and 6 in table 9, if "total per cent of component" is substituted in the equation for P_1, P_2, and P_3, and "limits of component" is substituted for N_1, N_2, and N_3.

Applying this method to the mixtures given above, one obtains—

1. Lower limit $= \dfrac{100}{\frac{64.8}{8.5} + \frac{35.2}{14.6}} = 10.00\%$

2. Lower limit $= \dfrac{100}{\frac{68.2}{8.4} + \frac{31.8}{13.6}} = 9.55\%$

Upper limit $= \dfrac{100}{\frac{64.8}{19.0} + \frac{35.2}{32.1}} = 22.15\%$

Upper limit $= \dfrac{100}{\frac{68.2}{20.8} + \frac{31.8}{27.9}} = 22.60\%$

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The above values show that the results obtained by calculation vary somewhat, depending on how and in what proportions the nitrogen and carbon dioxide are combined with the different combustibles. However, the maximum variation, obtained by calculation due to combining the inert gases nitrogen and carbon dioxide with the combustibles in various manners, usually does not exceed 1.0 per cent.

Methane, Ethane, Nitrogen, and Carbon Dioxide Mixtures

Eight different mixtures of methane, ethane, nitrogen, and carbon dioxide were prepared, the mixtures carefully analyzed, stored in a 60-liter mercury gas holder, and the limits of inflammability determined by the method (reference 4) previously referred to.

Although data have been obtained in this report for calculating the limits of inflammability of methane, ethane, propane, and butane gases containing nitrogen and carbon dioxide, or both, the test mixtures have been limited to methane, ethane, nitrogen, and carbon dioxide, or both. The test mixtures given in table 10 cover most of the compositions of natural gases on which information is desired at present. The maximum and minimum calculated values are given for the various mixtures tested. The results obtained by calculation and actual determination for all the test mixtures are in good agreement and show that the limits of inflammability of natural gases containing methane, ethane, and rather high concentrations of nitrogen and carbon dioxide may be closely determined by calculation.

General Conclusions

Data have been obtained on the extinction of propane and butane flames by the addition of nitrogen and carbon dioxide. Curves have been drawn and tables prepared showing the limits of inflammability of methane, ethane, propane, and butane with varying amounts of added nitrogen and carbon dioxide over the entire range of inflammability of such mixtures.

This information enables the limits of inflammability of natural gases containing one or more of the constituents (methane, ethane, propane, butane, nitrogen, and carbon dioxide) to be calculated.

Table 10.—Variations Between Calculated and Determined Limits of Inflammability of Methane, Ethane, Nitrogen, and Carbon Dioxide Mixtures

Test No.	Composition of test mixture per cent by volume				Calculated limits		Determined limits		Difference, per cent	
	CO_2	CH_4	C_2H_6	N_2	Lower	Upper	Lower	Upper	Lower	Upper
					5.40	15.45				
1	0.0	73.1	12.1	14.8	5.45	15.45	5.70	15.10	0.30	0.35
					6.05	17.35				
2	.0	52.3	19.0	28.7	6.05	17.45	6.00	16.95	.05	.45
					7.75	21.35				
3	.0	26.3	23.6	50.1	8.00	21.85	8.20	21.50	.30	.10
					12.20	26.50				
4	.0	27.5	8.4	64.1	12.65	27.35	12.40	26.75	.00	.20
					21.00	35.00				
5	.0	14.5	5.7	79.8	21.45	36.10	20.95	34.80	.25	.75
					5.30	15.15				
6	14.8	69.0	15.8	.4	5.45	15.45	5.40	15.30	.00	.00
					6.20	16.85				
7	29.1	52.6	18.0	.3	6.50	17.20	6.20	17.00	.05	.00
					9.60	22.15				
8	24.2	40.6	7.6	27.6	10.00	22.60	10.05	22.15	.25	.20

The method of calculation follows that described in United States Bureau of Mines Technical Paper 450 entitled "The Inflammability of Mixed Gases."

Test mixtures of methane, ethane, nitrogen, and carbon dioxide were prepared and the limits of inflammability were both determined and calculated. The results showed that the actual limits of inflammability can be closely ascertained by calculation.

Table 6.—Limits of Inflammability of Propane and Carbon Dioxide Mixtures

Volumes of carbon dioxide per volume of propane	Inflammability limits	
	Lower	Upper
0.0	2.3	9.5
.1	2.5	10.2
.2	2.6	10.9
.3	2.9	11.7
.4	3.2	12.3
.5	3.4	12.9
.6	3.6	13.5
.7	3.9	14.2
.8	4.2	14.8
.9	4.4	15.3
1.0	4.6	15.7
1.1	5.0	16.0
1.2	5.2	16.4
1.3	5.5	16.8
1.4	5.7	17.3
1.5	6.0	17.7
1.6	6.3	18.1
1.7	6.5	18.6
1.8	6.8	19.0
1.9	7.1	19.4
2.0	7.4	19.8
2.1	7.7	20.2
2.2	7.9	20.6
2.3	8.2	21.0
2.4	8.5	21.4
2.5	8.7	21.8
2.6	9.0	22.1
2.7	9.2	22.4
2.8	9.4	22.7
2.9	9.7	23.0
3.0	9.9	23.3
3.1	10.2	23.6
3.2	10.4	23.8
3.3	10.7	24.1
3.4	10.9	24.4
3.5	11.1	24.7
3.6	11.3	25.0
3.7	11.6	25.3
3.8	11.8	25.5
3.9	12.1	25.8
4.0	12.4	26.0
4.1	12.6	26.3
4.2	12.9	26.5
4.3	13.2	26.7
4.4	13.5	26.9
4.5	13.9	27.1
4.6	14.2	27.3
4.7	14.6	27.5
4.8	15.0	27.7
4.9	15.3	27.9
5.0	15.7	28.1
5.1	16.1	28.3
5.2	16.5	28.5
5.3	16.9	28.7
5.4	17.3	28.8
5.5	17.6	29.0
5.6	17.9	29.2
5.7	18.2	29.4
5.8	18.6	29.5
5.9	19.0	29.7
6.0	19.4	29.9
6.1	19.7	30.1
6.2	20.1	30.2
6.3	20.4	30.4
6.4	20.8	30.5
6.5	21.2	30.7
6.6	21.7	30.8
6.7	22.2	30.9
6.8	22.7	31.0
6.9	23.3	31.2
7.0	23.8	31.3
7.1	24.3	31.4
7.2	24.9	31.5
7.3	25.5	31.6
7.4	26.0	31.8
7.5	26.6	31.9
7.6	27.2	32.0
7.7	27.7	32.2
7.8	28.2	32.3
7.9	28.7	32.3
8.0	29.3	32.1
8.1	29.9	31.6
8.2	30.7	30.7
8.3	(1)	...

[1] Noninflammable.

Table 7.—Limits of Inflammability of Butane and Nitrogen Mixtures

Volumes of nitrogen per volume of butane	Inflammability limits	
	Lower	Upper
0.0	1.8	8.5
.1	2.0	9.0
.2	2.3	9.5
.3	2.5	10.0
.4	2.7	10.6
.5	3.0	11.5
.6	3.2	12.0
.7	3.3	12.6
.8	3.4	13.3
.9	3.5	14.0
1.0	3.7	14.5
1.1	3.8	15.0
1.2	4.0	15.5
1.3	4.2	16.0
1.4	4.4	16.6
1.5	4.5	17.2
1.6	4.7	17.7
1.7	4.9	18.2
1.8	5.0	18.8
1.9	5.2	19.2
2.0	5.5	19.8

Volumes of nitrogen per volume of butane	Inflammability limits Lower	Upper
2.1	5.7	20.2
2.2	5.8	20.5
2.3	6.0	21.0
2.4	6.2	21.5
2.5	6.3	22.0
2.6	6.5	22.4
2.7	6.7	22.8
2.8	6.9	23.3
2.9	7.1	23.7
3.0	7.3	24.1
3.1	7.5	24.5
3.2	7.7	24.9
3.3	7.8	25.3
3.4	8.0	25.7
3.5	8.2	26.1
3.6	8.4	26.5
3.7	8.6	26.8
3.8	8.8	27.2
3.9	9.0	27.6
4.0	9.2	28.0
4.1	9.4	28.4
4.2	9.5	28.7
4.3	9.7	29.0
4.4	9.9	29.3
4.5	10.1	29.6
4.6	10.3	29.9
4.7	10.5	30.2
4.8	10.7	30.5
4.9	10.9	30.8
5.0	11.0	31.0
5.1	11.2	31.3
5.2	11.4	31.6
5.3	11.6	31.8
5.4	11.8	32.1
5.5	12.0	32.3
5.6	12.2	32.6
5.7	12.4	32.8
5.8	12.5	33.0
5.9	12.7	33.3
6.0	12.9	33.5
6.1	13.1	33.7
6.2	13.3	33.8
6.3	13.5	34.0
6.4	13.7	34.2
6.5	13.9	34.4
6.6	14.1	34.6
6.7	14.3	34.8
6.8	14.5	35.0
6.9	14.7	35.1
7.0	14.9	35.3
7.1	15.0	35.4
7.2	15.2	35.5
7.3	15.4	35.7
7.4	15.6	35.8
7.5	15.8	36.0
7.6	16.0	36.1
7.7	16.2	36.2
7.8	16.4	36.4
7.9	16.6	36.5
8.0	16.8	36.6
8.1	17.0	36.7
8.2	17.2	36.8
8.3	17.4	37.0
8.4	17.7	37.1
8.5	17.8	37.2
8.6	18.0	37.3
8.7	18.2	37.4
8.8	18.5	37.5
8.9	18.7	37.6
9.0	18.9	37.7
9.1	19.1	37.8
9.2	19.3	37.9
9.3	19.5	38.0
9.4	19.7	38.1
9.5	19.9	38.2
9.6	20.1	38.3
9.7	20.3	38.4
9.8	20.5	38.5
9.9	20.7	38.6
10.0	20.9	38.7
10.1	21.1	38.8
10.2	21.3	38.9
10.3	21.5	38.9
10.4	21.7	39.0
10.5	21.9	39.1
10.6	22.2	39.2
10.7	22.4	39.2
10.8	22.6	39.3
10.9	22.8	39.4
11.0	23.0	39.4
11.1	23.2	39.5
11.2	23.4	39.6
11.3	23.6	39.7
11.4	23.8	39.7
11.5	24.0	39.8
11.6	24.2	39.9
11.7	24.5	40.0
11.8	24.7	40.0
11.9	24.9	40.1
12.0	25.1	40.2
12.1	25.3	40.3
12.2	25.5	40.3
12.3	25.8	40.4
12.4	26.0	40.5
12.5	26.3	40.5
12.6	26.5	40.6
12.7	26.7	40.7
12.8	27.0	40.7
12.9	27.2	40.8
13.0	27.4	40.9
13.1	27.7	41.0
13.2	27.9	41.1
13.3	28.2	41.2
13.4	28.4	41.3
13.5	28.6	41.3
13.6	28.9	41.4
13.7	29.2	41.4
13.8	29.4	41.5
13.9	29.6	41.5
14.0	29.8	41.6
14.1	30.1	41.6
14.2	30.4	41.7
14.3	30.7	41.7
14.4	31.0	41.8
14.5	31.3	41.8
14.6	31.5	41.9
14.7	31.7	41.9
14.8	32.0	42.0
14.9	32.3	42.0
15.0	32.5	42.0
15.1	32.8	42.1
15.2	33.1	42.1
15.3	33.4	42.1
15.4	33.7	42.1
15.5	34.0	42.0
15.6	34.3	42.0
15.7	34.6	42.0
15.8	34.9	42.0
15.9	35.2	41.9
16.0	35.5	41.8
16.1	35.8	41.7
16.2	36.1	41.7
16.3	36.5	41.6
16.4	36.8	41.5
16.5	37.1	41.4
16.6	37.5	41.3
16.7	37.8	41.1
16.8	38.2	40.8
16.9	38.5	40.6
17.0	38.9	40.4
17.1	39.3	40.1
17.2	39.7	39.7
17.3	[1]	...

[1] Noninflammable.

Volumes of carbon dioxide per volume of butane	Inflammability limits Lower	Upper
0.0	1.8	8.5
.1	2.1	9.0
.2	2.3	9.5
.3	2.5	10.0
.4	2.7	10.5
.5	2.9	11.1
.6	3.1	11.7
.7	3.3	12.2
.8	3.5	12.8
.9	3.7	13.4
1.0	3.9	14.0
1.1	4.1	14.5
1.2	4.3	15.0
1.3	4.5	15.5
1.4	4.7	16.0
1.5	4.9	16.5
1.6	5.1	17.0
1.7	5.3	17.4
1.8	5.5	17.9
1.9	5.7	18.3
2.0	5.9	18.7
2.1	6.1	19.2
2.2	6.3	19.6
2.3	6.5	20.0
2.4	6.7	20.4
2.5	6.9	20.8
2.6	7.1	21.2
2.7	7.3	21.6
2.8	7.6	22.0
2.9	7.8	22.3
3.0	8.0	22.6
3.1	8.3	22.9
3.2	8.5	23.2
3.3	8.7	23.5
3.4	9.0	23.8
3.5	9.2	24.0
3.6	9.4	24.3
3.7	9.7	24.5
3.8	9.9	24.8
3.9	10.2	25.0
4.0	10.4	25.2
4.1	10.7	25.4
4.2	10.9	25.6
4.3	11.2	25.8
4.4	11.4	26.0
4.5	11.7	26.2
4.6	11.9	26.4
4.7	12.2	26.6
4.8	12.4	26.8

Volumes of of carbon dioxide per volume of butane	Inflammability limits Lower	Upper
4.9	12.7	27.0
5.0	12.9	27.2
5.1	13.2	27.4
5.2	13.4	27.6
5.3	13.7	27.8
5.4	13.9	28.0
5.5	14.2	28.1
5.6	14.5	28.3
5.7	14.7	28.4
5.8	15.0	28.5
5.9	15.3	28.7
6.0	15.5	28.8
6.1	15.8	29.0
6.2	16.1	29.2
6.3	16.4	29.3
6.4	16.7	29.4
6.5	17.0	29.5
6.6	17.3	29.7
6.7	17.6	29.8
6.8	17.9	29.9
6.9	18.2	30.0
7.0	18.5	30.1
7.1	18.8	30.2
7.2	19.1	30.2
7.3	19.4	30.3
7.4	19.7	30.4
7.5	20.0	30.4
7.6	20.3	30.5
7.7	20.7	30.5
7.8	21.0	30.5
7.9	21.3	30.5
8.0	21.7	30.5
8.1	22.0	30.5
8.2	22.4	30.5
8.3	22.7	30.5
8.4	23.1	30.5
8.5	23.5	30.5
8.6	24.0	30.4
8.7	24.5	30.4
8.8	25.0	30.3
8.9	25.6	30.3
9.0	26.2	30.2
9.1	27.2	30.1
9.2	28.5	30.0
9.3	29.9	29.9
9.4	[1]	...

[1] Noninflammable.

Gas Toasts Wheat Flakes

WHEAT flakes are produced through a process of oven-baking raw wheat, flavored with honey, then crimping the wheat grain so that it becomes a one-piece flake when mashed by giant rollers. The flaked wheat is then toasted, put through a special purifying process and chuted into waiting packages. This is the way it is done by the Tennessee Cereal Company. An analysis of the wheat flakes by food experts has proved that, through the process used, the nutritious properties of the whole wheat are retained with the added nutritiousness of honey, used for flavor. The company purchases 50,000 bushels of wheat, 18 tons of honey, a million cartons, a million wax paper bags, and 200,000 shipping cases at a time.

The wheat flakes are toasted in gas bake ovens 27 ft. long, 8 ft. high and 4 ft. wide, each toasting 300 lb. an hour. They have an annual gas consumption of 1,250,000 cu. ft. The plant is capable of producing 21,600 packages of the wheat flakes each day.—*American Gas Assn.*

Notes on High Pressure Gas Distribution

Reconnaissance Survey, Qualification of Engineer, Geology, Topography and other Factors Influencing Development of Distribution System Discussed by DISTRIBUTION ENGINEER

FURNISHED with a set of distances along the various streets to be served and with the expected demands, any person capable of substituting figures in a formula and obtaining the arithmetical answer can produce a distribution design having the proper sizes of main and appearing complete, even if viewed only on a drafting board. To produce the figures for substitution in the formulae from the diverse conditions encountered in actual field work, necessitates not only a mass of measured distances and observed surface conditions but also a fund of judgment.

When an engineer receives a request for an estimate, about all he is given is the name of a city, village or town and the desire of the inhabitants for gas. Few financiers or executives comprehend the quantity of facts and numerous details which must be correlated to produce an estimate of cost for a gas distribution system, which takes little more letter space to report in total than the brief request for the information. The ease of requesting together with the definite and concise character of the submitted estimated costs may leave the impression that but a short time is required for such work.

Fig. 2—Steep hill and proximity of vegetation and earth banks along side roadway are topographical conditions which prevented the use of a trenching machine and materially increased cost of excavation. Added difficulty is concrete surface of roadway.

Fig. 1—Geological formations in evidence from surface. Mill-wrapped enamel coating protects pipe against severe construction conditions. Back-fill around pipe itself is soil.

A rough estimated cost can be produced on short notice, based, however, on such unreliable figures as may be secured by taking available population figures together with known investment costs per unit of population in other sections and assuming such averages to hold true in the new section. Also maps may be scaled or the speedometer of an automobile used to secure the approximate amount of main to be run and experience cost figures applied to the new territory. Naturally any of the above estimates should be based on approximately similar distribution systems having practically the same demands as expected in the new territory. Such estimates have a certain value in providing an inexpensive tentative estimate on which to base the initial decision as to the potential profit-producing power of the territory. Since but little reliability can be placed on such estimates, it will be assumed in the following discussion that accuracy is essential and a proper engineering design is desired which may be used for both estimating and construction purposes or securing bids from qualified concerns for a complete installation.

The entire project is generally placed in the hands of a qualified engineer, who will require an intimate knowledge of the section to be served before the type of system is decided upon or field surveys organized. This engineer should make a reconnaissance survey for the pur-

Fig. 3—Illustrates care necessary due to landscaping. Note burlap underneath excavated material. Sod carefully removed. Blue-stone driveway, 25 feet wide was driven under.

pose of securing general knowledge of the numerous conditions. Such a knowledge will result in a more economical field survey, as experience and judgment will be substituted for the necessity of securing a mass of unnecessary field data and will guard against a lack of vital facts.

Qualifications of Engineer—The designated engineer should be responsible for correlating the decisions of all interested parties within a utility and for recommending the final design, since his judgment may indicate that a certain type of system, shown by the estimates as resulting in apparently higher total costs per thousand feet of gas sold, would be more desirable over a long period of years than the initial costs only may indicate. If there is no engineer available within an organization who is versed in the details of construction, operation, and maintenance of a system and has a keen vision of future load possibilities and a realization of the value resulting from a close cooperation with a new business department, others should be designated to assist the responsible engineer to select the most preferable operating system, consumer service and load. A valuable asset for the responsible person is an ability to contact amiably with the prospective consumers and officials of the political divisions granting the franchise.

Who Should Contact

Some utilities allow only the local commercial or new business department manager to contact with the public and public officials, which eliminates the engineering department. Theoretically this may be considered good practice, but during the installation and initial operation of any system the responsible engineer must contact with potential consumers and public officials due to the numerous questions arising during such development work, and which can only be satisfactorily answered by the directly responsible engineer. The appointee should be an engineer, as practically all questions directly or indirectly involve the technical phases of the work.

It is imperative that the executives designating the responsible party have full confidence in the one chosen and also that he be invested with full responsibility, so that decisions may be immediately rendered on all field matters, whether originating with the public or within the utility. These are matters which for various reasons can not be answered, but the placing of full confidence in a single person assumes that he acknowledges his limitations, which are few and seldom encountered as they deal mostly with factors involving the franchise, the full knowledge of which is confined to a few persons at best. With such a representative, who is not only responsible but willing to assume the attendant obligations, better public relations are fostered at a vital period. For this reason, if for no other, executives who are directly responsible to the board of directors may profitably take a personal interest in the selection of the representative.

Geology—The field work of the reconnaissance survey, while including many phases, is general, and leaves details for the field survey A sufficient knowledge of the geology of the section can often be secured by observation from an automobile trip of inspection. If such a trip discloses possible difficulties indicating the desirability of further information, this can usually be secured by interviewing various local organizations who have had occasion to install sub-surface structures. The geology of a section materially affects trenching costs. The reconnaissance survey will indicate the effect of geological formations on costs, suggest the most favorable season of the year to conduct trenching operations, the methods of trenching and back-filling, the value of limiting the amount of trench open at one time to minimize cave-ins, etc.

Geology not only determines the method of laying pipe, by the ease with which a uniform firm foundation for the main may be secured, and the feasibility of driving, tunneling or drilling to minimize costs, but also the selection and life of the type of pipe coating and the consequent care with which trenching and back-filling operations must be conducted.

Even public relations are affected by the character of the ground which must be excavated, since certain soil types, such as clay and heavy loams, readily adhere to anything they contact, while some formations are the cause of exceptionally heavy dust clouds. This may seem a highly theoretical possibility of complaints and even refusal of service, but it will be found particularly true in many suburban and rural territories.

A common cause of complaint and the source of adverse memories is the destruction by many types of geological formations of carefully nutured grass on which the material excavated is deposited. Where trenches must be excavated in grass plots, the added costs of carefully removing and replacing the sod benefits public relations. There are many instances where permits to excavate certain streets were contingent only on the care of the grass.

In mining districts where the main locations are apt to be undercut and in terriories subject to earthquakes, special precautions will be necessary to provide the required factor of safety.

Study Due to Temperature

Territories subject to extreme hot or cold temperatures require additional study to determine the desirability of deep burial to minimize temperature changes. The differential of seasonal temperatures has more effect than extremes of only one type. Many steel lines have been subjected to frost action each year with no apparent effect, but the type of soil has much to do with absence of failures. Depth of burial also affects the temperature of the gas and may be a slight factor in the increasing or decreasing of unaccounted-for gas.

Detailed examinations and measurements of the extent and nature of geological formations are seldom secured, so that their effect on costs and other factors is a matter of judgment and emphasizes the value of experience.

Topography—The effect of topography is not as extensive as geology. In the majority of small high pressure installations the gas fed into the section is sufficiently dry to eliminate the necessity for drips which increase costs when used.

Trenching costs are increased in hilly sections, especially where rapid changes occur in the contour of the land. On a map, roads may be indicated as continuous, whereas ac-

tually the steep contour makes their use in certain sections impractical if not impossible.

Service costs are materially increased where there are retaining walls on one side of the street and rapid drops in elevations below the street surface level on the opposite. This condition also increases the difficulty of keeping a trenching machine level and disposing of excavated material conveniently with no interference to traffic.

Both service and main trenches are affected in hilly sections where the washing effect of rains may cause considerable damage to the trench and carry away excavated material, necessitating carting material to completely re-fill a trench.

Topography may be the reason for designing a system in a star shape, the center laying in a valley and the prongs extending into several valleys. Rivers alter designs and result in costly crossings even in distribution systems. Topography and real estate developers are about equal causes in making each distribution system adopt an individuality with inherent peculiarities and difficulties.

Landscaping—The extensive work of the distribution design engineer is today confined to smaller communities, since cities already have gas service. Many of these communities take particular pride in the appearance of their highways, and continue planting trees with expert maintenance at considerable public expense which a utility should consider and provide for in construction costs, as the care necessary to eliminate damage to such improvements will increase costs. Newspapers are particularly susceptible to destruction or possible damage of landscaping; giving publicity that is difficult to counteract. Careful attention to trees and shrubs planted by villages and towns often results in a reciprocation of favors by the officials in other matters where their strict adherence to technical details would considerably add to total costs.

Highway Surfaces—The extent of concrete surfacing on highways is becoming of increased importance in every phase of utility construction and operation. It is one instance where an individual's successful prediction of future road surface conditions is of vital importance. The

Fig. 4—Same location as shown in figure 3 —two days later in very dry weather. Note line of trench is hardly visible and no signs of work done remain.

interviewing of public officials indicates only their proposed plans during a brief tenure of office and is of little value in selecting a design to meet conditions over the expectant life of the system. Extreme accuracy of prediction is impossible but the most fantastic dreams of the extent to which concrete would exist ten years ago have been more than exceeded in actuality.

The existence or possibility of curb-to-curb concrete on any of the highways instantly suggests the value of using the sidewalk or parkway areas. Where concrete curb-to-curb actually exists estimates can distinctly show the differences in cost of various locations on the street. While the prediction of locations where such improvements will obtain can not be made with any degree of accuracy, the experience of an individual connected with a utility is superior to information received from officials in office at the time of the survey, since their attitude and aims are confined to a definite term of office. Each community has individual characteristics just as varied as are personalities among human beings. The policy of some towns is to spend tremendous sums in concreting the surface of highways, not only during the particular term of office of certain individuals but over a long period of years, and requires a different design from one which favors macadam or other types. The nature of the type of improvement selected for emphasis is apparent from a properly conducted reconnaissance survey.

An elaborate economic study to determine the desirable location for mains as determined from the nature of the improved roadway is seldom necessary, since it is readily apparent on observation that installation may be considerably more expensive at one location than another. However, even when it is determined to use the sidewalk or parkway areas the decision is complete only in generality, and the location in the sidewalk requires intensive observation of conditions in that area. Considerable assistance in explaining possible main locations to those responsible for detailed layouts and installation results from the use of photographs taken and marked by the one conducting the reconnaissance survey. The squares of the concrete sidewalks may be unequal in size, in which case it is desirable to indicate that the main will be laid along the line of smallest squares, if the policy is replacing a whole square wherever concrete is broken which is recommended as fostering good will. To the one making the survey the type of trees existing along the sidewalks will immediately indicate the extent and nature of the roots to be encountered during construction, with the result that the suggestion as to locations will be to avoid the largest number.

Many of the roadways will be surfaced with a type that is considered equivalent to concrete, such as macadam, wood block, brick, cobble stone on concrete base, etc., each of which results in definite conclusions regarding the location of the main and method of construction. Macadam, while easily removed, is difficult to satisfactorily replace, as there is likelihood of settlement of adjacent areas. In each of these cases, as with concrete, the decision is frequently to remove an improved concrete gutter since it only requires replacement of a narrow strip.

Particular difficulty is also encountered by the construction gangs on semi-improved highways due to the use of oil, loam, etc., as a retaining medium on the road surface. This type of improvement is easily disturbed and difficult to replace, so that the survey should indicate to

the mappers the preferable location on such roads which is usually in the dirt shoulders or gutter.

Not only is the physical nature of the roadways important but also the determination of whether they are controlled by city, village, town, county or state. Each of these political divisions has its own regulations for locations of sub-surface structures on highways and the method of conducting the work.

Contact with Public Officials—Plans have seldom been developed to the point where it is desirable to make contact with public officials at the time of a reconnaissance survey, but is recommended if at all possible. Even though rules for construction work on highways are definitely set forth in print by a political unit, many phases will require interpretation and those particularly difficult if not impossible to follow may be changed by proper contact and frank explanation. Photographs marked with proposed locations of structures and mains are again valuable in saving time, leaving a definite record as to the desires of a utility and for field use by a town committee. After all agreements are satisfactory between a utility and officials, there are some individuals who will object to the construction work and carry their ideas to public officials who must be thoroughly convinced on reasons for the selected locations and methods, if they are to show their constituents the desirability of following utility plans.

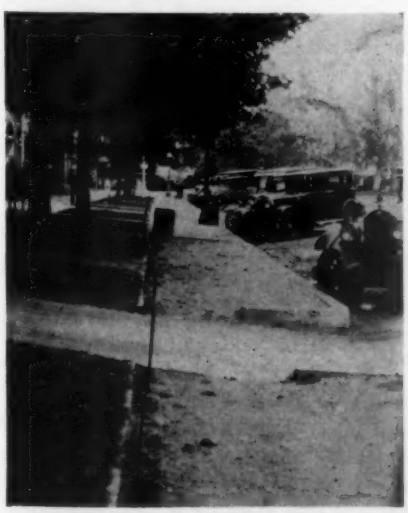


Fig. 5—Note that line of main was changed from dirt section of parkway into grass section where concrete commences. No study is necessary to select economical location in this condition.

The preferable method of informing officials is to conduct them on a tour of recently completed sections when available, as that which is visible to the eye is much more convincing than oral description. Less satisfactory, but often necessary, is written testimony from officials of other political units which if previously secured by a utility and immediately available will be open to the objection of being secured through some influence. Lists of completed systems should be furnished to the unit being contacted, with a recommendation of corresponding with the officials who have had the experience of seeing a system installed.

Frank Discussion Necessary

A frank discussion of reasons for selecting certain main locations on highways has in a number of instances resulted in much better accord between officials and a utility than allowing the discussion to follow some complaint by property owners who may object for reasons applicable only to themselves. The attitude that the selection of a location on each individual street is the prerogative of the utility should not be tolerated even in the smallest of towns.

The advantage of the reconnaissance engineer contacting officials before securing a franchise provides harmonious relationships between officials, individuals and a utility previous to actual construction, is valuable in having the clauses of a franchise applying to each phase of engineering clearly understood and in most cases results in fewer written restrictions than ordinarily found, thus allowing the work to proceed with minor changes easily acceptable by some one designated official.

Direction of Growth—The direction of future growth influences design similarly to topography. Development seldom takes place en-masse, but generally along lines which radiate from the center of concentrated settlement and the intervening areas develop gradually. It is not difficult to pick the particular sections of recent growth from the new character of the buildings. However, unless growth is forced to follow a certain direction due to decided topographical conditions, the prediction of continued development in any one area or direction is practically impossible. As common in any field of endeavor, it is found that the personality of an individual in control of a development is of more consequence in producing growth than all of the favorable physical characteristics and convenience of location combined. This fact is of considerable importance in some designs, as a large growth in certain areas may be predicted by a thorough knowledge of who is conducting the development.

The reconnaissance survey should not be limited to strictly the franchise territory but should be extended to include any possible future service in adjacent areas, so that sub-transmission mains may be provided in the proper directions. Sections where service was considered remote under the state of finances existing during the design of adjacent territories, were served only a few years later under improved economic conditions, and resulted in additional expense through lack of foresight on the original design.

Natural trends of growth are along railroads, interurban lines, interconnecting highways, along streams and water fronts, valleys, in favorable agricultural districts and in territories of cheap labor. Such a list could be continued over a wide range of favorable characteristics and yet not indicate reasons which

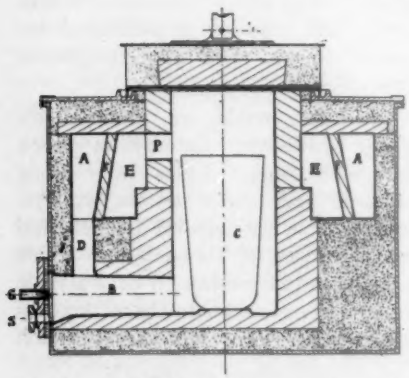
(Continued on page 35)

Fig. 6—Main location changed from dirt section to section of concrete sidewalk having narrowest squares.

Technical Digest

NEW GAS CRUCIBLE FURNACE

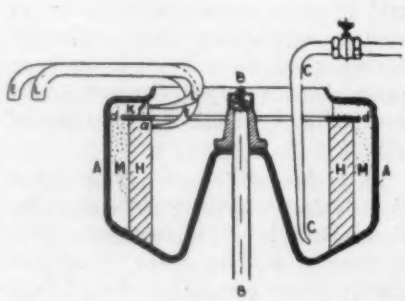
A new type of gas-fired furnace is shown in the accompanying illustration. The furnace consists of a heavy cast iron casing lined with suitable insulation material, shown in dotted lines. There is an inner refractory lining. The air is preheated by external and internal recuperators. The crucible (C) is supported on a small raised stand. If it cracks and allows the metal to run into the furnace, a fusible seal (S) is melted and the metal drains off without any interference with the supply of gas. Gas issues through the nozzle (G) and induces the air with it in the induction tube (B).



The gas and air enter the main chamber of the furnace tangentially and burn while the mixture swirls round the crucible (C), before passing out through the exhaust port (P) into the exhaust flue (E). The hot exhaust gases then travel round the exhaust flue (E) and heat the air in the flue (A) through the refractory wall (F). They then pass into the external metal recuperator and give up still more of their heat to the incoming air before passing up the flue. This air is thus heated before it enters the flue (A) in which it is heated still further before it passes through the downtake (D) to the induction tube (B). Since the gas and air are not mixed before they are ignited, a much softer flame is obtained which does not cut the crucible or the lining, as is often the case with gas-fired or oil-fired crucible furnaces. Details are given on the operation of the furnace. *—Anonymous. Gas Journal, volume 202, 1933, page 806. (E-2).*

CENTRIFUGAL TAR DEHYDRATION

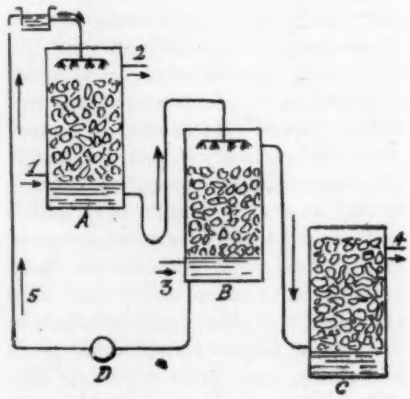
The principle of the operation of the apparatus is illustrated in the accompanying figure. The machine has a large bowl of diameter 27.5 inches and runs at a speed of 2700 r.p.m. Its useful capacity for the retention of sludge is nine gallons. Near the top of the bowl is a flat horizontal ring (d) forming a diaphragm enabling separate withdrawal of the tar and liquor. Crude tar is delivered through a pipe (C) extending nearly to the bottom of the bowl. Rotation of the machine causes the tar to be thrown towards the wall of the bowl, the liquor forming an annulus nearer the axis. Sludge is precipitated on the wall. The tar tends to climb above the diaphragm (d), and by virtue of its velocity passed into a curved adjustable ejector tube (L). The liquor remains below the diaphragm and is removed by means of a fixed curved tube (E). The tar should be warmed to 105 to 125 degrees F. The throughput depends on the nature of the tar, its temperature, and on the degree of dehydration desired. In a



particular example with throughputs of 270, 160 and 70 gallons per hour, the liquor contents of the outgoing tars were 0.6, 0.5 and 0.4 per cent respectively, the temperature being 122 degrees F. In another installation with a throughput of 180 gallons per hour, the liquor content was reduced to 0.7 per cent. *—Anonymous. Journal des Usines a Gaz, volume 57, 1933, pages 241 to 242.*

PURIFYING GAS WITH AMMONIA LIQUOR

The principal details of the process are described. Reactions involved in the process are fixation of oxygen in air by means of ammonium pyrogallate, oxidation of sulphuretted hydrogen by oxygen to give water and precipitated sulphur, combination of cyanogen and sulphuretted hydrogen to give ammonium sulphocyanide and combination of ammonium ferro and ferri-cyanides with oxygen and sulphuretted hydrogen. There are also other less

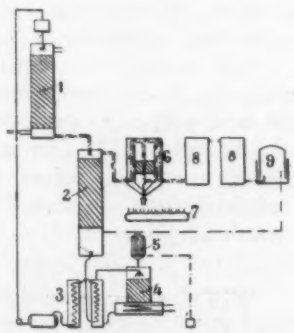


important reactions. Polyphenols are present in the ammonia liquor according to a test which is described in detail and these polyphenols take part in the purification process. Desulphurized ammonia liquor is used for the purification of gas by a new process which is effected in apparatus shown diagrammatically in the accompanying illustration. The foul gas enters at (1) and the purified gas leaves at (2). The gas accordingly passes through the wash tower (A), which is filled with graphite and irrigated with the desulphurized liquor. A second washer (B) is provided, also filled with graphite and irrigated with desulphurized ammonia liquor. Air is fed into this tower at (3). There is a third washer (C), which is also filled with graphite and irrigated with sulphuric acid so that a solution of ammonium sulphate is obtained from the reaction between the traces of ammonia still left in the gas and the acid. The circulation of the desulphurized am-

monia liquor is indicated by the line (5), the pump (D) being inserted in the line to pump the liquor to the top of the first washer (A). *—Vany. Les Gaz et l'Electricite, volume 69, 1933, pages 212-4.*

ACTIVATED CARBON IN PURIFICATION OF GAS

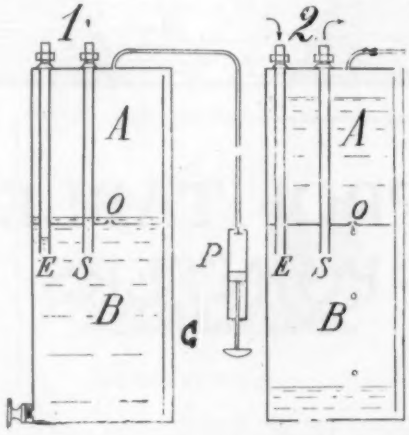
The apparatus in which this process (Bezougly-Koutsakov) is carried out is shown in the accompanying illustration. The scrubber for the absorption of sulphuretted hydrogen is shown at (L), apparatus for removing the sulphuretted hydrogen is shown at (2), heat exchanger for potassium carbonate solution at (3), carbonate regenerator at (4), dephlegmator at (5), contact apparatus for sulphuretted hydrogen at (6), carrier for the liquid sulphur at (7), recuperators for sulphur powder at (8) and collector of carbon dioxide at (9). The process of oxidation of the sulphuretted hydrogen and extraction of the precipitated sulphur in the pores of the activated carbon is effected simultaneously. This permits the utilization of the catalytic properties of the activated carbon without there being any need of too frequent regeneration. The efficiency of the oxidation process is as much as 93 per cent. The impurities present in the coal gas or the coke oven gas do not affect the process appreciably nor the activity of the carbon. The gas is first passed



through tar washers and extractors and then through scrubbers irrigated with potassium carbonate solution. Hydrogen sulphide, carbon dioxide and a part of the carbon disulphide are thus absorbed. Purified gas leaves the plant, while the scrubber liquid is treated according to Petit's process. The gas obtained from this treatment contains up to a maximum of ten per cent of sulphuretted hydrogen. It is then processed in the installation described above. *—M. D. Koenigstuhl. Koks i Khimica, volume 7, No. 7, 32 to 37.*

GAS SAFETY VALVE

The illustration shows a gas safety valve used for the purpose of protecting consumers from escaping gas due to one reason or another. The automatic hydraulic valve consists of a small vertical cylinder, divided into two chambers (A) and (B) by means of a diaphragm containing small holes (O). The valve in closed



position is shown on the left in the figure. The ends of the gas inlet and outlet pipes (E) and (S) then extend below the surface of the water in the compartment (B). To effect flow of gas, a slight vacuum is created in the chamber (A) by means of the hand-pump (P). Water then rises through (C) into the chamber (A). The open position of the valve is shown at the right in the figure. *—A. Grebel. Le Gaz et L'Electricite, volume 69, 1933, page 214.*

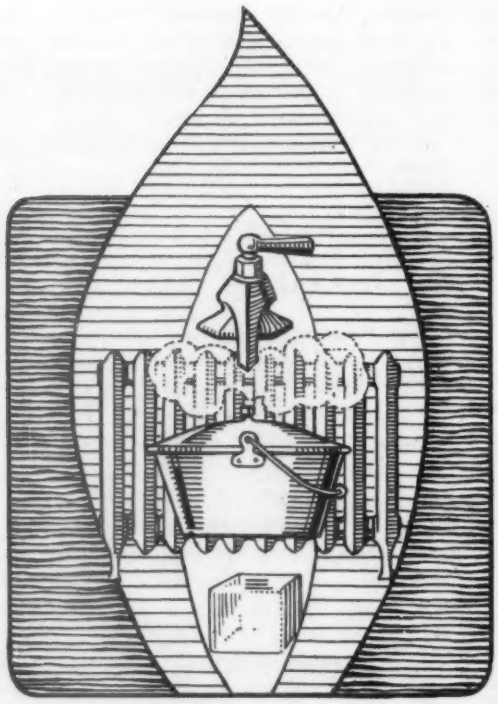
PREVENTING NAPHTHALENE DEPOSITS IN MAINS

Oxidized dehydrogenated petroleum products can be used to advantage in the place of tetralin for spraying gas to remove naphthalene. These products are treated with air at a suitable temperature and pressure, with or without a catalyst. The warmed petroleum fraction is sprayed into a reaction chamber by means of a stream of air heated to 300 degrees C. The amount of air used depends on the nature of the petroleum fraction. In this process a gas having a calorific power of about 315 B.t.u. per cubic foot is obtained as a by-product. The liquid product has a specific gravity of about 0.1 higher than that of the raw material at a given boiling temperature. It consists of aromatic hydrocarbons of high boiling point (twenty to forty per cent), higher alcohols (ten to thirty per cent) and higher unsaturated and aromatic aldehydes and ketones (thirty to forty per cent). *—W. V. Piotrowski and J. Winkler. Brennstoff Chemie, volume 14, 1933, pages 208 to 209.*

DIVIDED TITRATION PIPET-STIRRING ROD

Tedious approach to the endpoint of a titration may be overcome by rapid titration followed by a back titration, but this requires preparation and a second standard solution, and accuracy is reduced. However, by the use of the specially designed stirring rod, illustrated herewith, and the division of the solution into two beakers and titration of one part rapidly and more confident titration of the second part, the difficulty is overcome. The pipet-stirring rod is made of hollow glass tubing. The lower half consists of a cylindrical barrel about twice the diameter of the tubing above and having a capacity of about four cubic centimeters. The lower end of the barrel is drawn out to a restricted tip, small enough to reduce considerably diffusion between the contents of the barrel and the surrounding liquor, but large enough to permit ready flow between them when desired. The pipet is fitted at the top with an ordinary glass stopcock, leaving a mouthpiece of glass about 2.5 centimeters above the cock. Its total strength is not longer than a stirring rod. Details of the manner in which this device is used are given in the original article.

—R. Richardson. Journal of the American Chemical Society, volume 55, 1933 pages 2794 to 2795.



PROFITABLE POINTERS

KEEP That Cooking Load; sell the home manager the most modern gas range you can possibly buy. Listen to this: "A refrigerator isn't going to sell a hot water heater, and nobody is going to put in a hot water heater because he bought a refrigerator. They won't in my town. They won't run a gas stove and put in an electric hot water heater." This from a man who knows the gas business and the electric business equally as well. Get the point—if you keep that cooking load you'll keep the water heating load, for the electric range has to come into the home first to get a rate that permits of water heating.

WHAT about your advertising? Have you pared your appropriation to the bone? Have you cut down on the size and number of insertions in the newspapers, stinted your window display advertising and stopped the use of direct mail pieces? If you have done these things do not wonder that your sales curve contains a deep sag. When business is sick it needs medicine; that medicine is

ADVERTISING. If you have done the things mentioned above there is little you may do to even out the curve for the past months—*but* you may do something to take the sag out of the curve you will plot in the months to come *if* you will but start at once to advertise. Think it over. Encourage business!

THE Hartford, Conn., Gas Company is building some very effective window display advertisements these days. Just take a look at the one reproduced on this page featuring the new type burner built into the modern gas storage water heater. This advertisement was a tie-in to newspaper and direct advertising used in Hartford to get folks thinking about automatic hot water service.

ABOUT a year ago we advocated the "tank" heater sale as a way to keep up merchandise revenue and gas sales per meter. Some folks who now say, "Look, all of those houses should have automatic water heaters," said we were crazy. Yesterday and several times during the past year we have smiled when we saw the "big-uns" of the industry running "tank" water heater advertisements in the metropolitan dailies and we have heard of others sending out mailings to up to 15,000 consumers. Sell them gas hot water service, even if they want a "tank" heater—that's our idea.

DON'T cut prices, anyone can do that. Be different; keep prices and values up and you will be able to attract real salesmen to your organization. Cheap sales people are a liability. Business IS better and it will grow better until we again reach a level where properly trained and properly compensated salesmen will be an asset. Keep this fact before you, even if you do not think much of prophets.

WITH everyone cooperating with President Roosevelt to make the N.R.A. a success, with price chiselers out of the picture and folks going back to work, thousands upon thousands of homes will be rehabilitated; new gas ranges will replace old worn out ones and folks who have wanted gas refrigerators will now be able to purchase them.

SALESMEN should take heart —that is, if they will but realize that the GAS range replacement business alone now represents 30% of the domestic GAS users in the United States. That is a worthwhile market and, despite what might be said about other fuels for home cooking, GAS holds and will hold first place in the preference of the wise home manager. GAS is flexible, clean, inexpensive and

may be had at reasonable rates in any city of any importance in the country. Think this over and start out NOW to preach the gospel of GAS cookery and the desirability of modernizing the kitchen.

IT'S OUR OPINION:

THAT the gas man will soon get back of the movement to sell the factory and the home, the public buildings and the places of amusement gas-air conditioning equipment.

THAT the gas man will push the idea of built-in all gas kitchens for the home; range, dish washer, hot water service and refrigerator.

THAT an off-peak water heater rate will be devised that will permit the so-called "average customer" to enjoy the full benefits of automatic, ever-ready hot water service.

THAT the *cheap* gas range will not be shown on the floors of good dealers or gas companies in the very near future. (Retailers at last have come to realize that there is no profit or satisfaction in selling merchandise that has been chiseled.)

THAT within two years air-cooled gas refrigerator sales will rank first, all types considered.

THAT the men who are employed to sell gas appliances will first be given a thorough education in appliances and their uses and the utilization of gas in the home before they are sent out to sell the consumer.

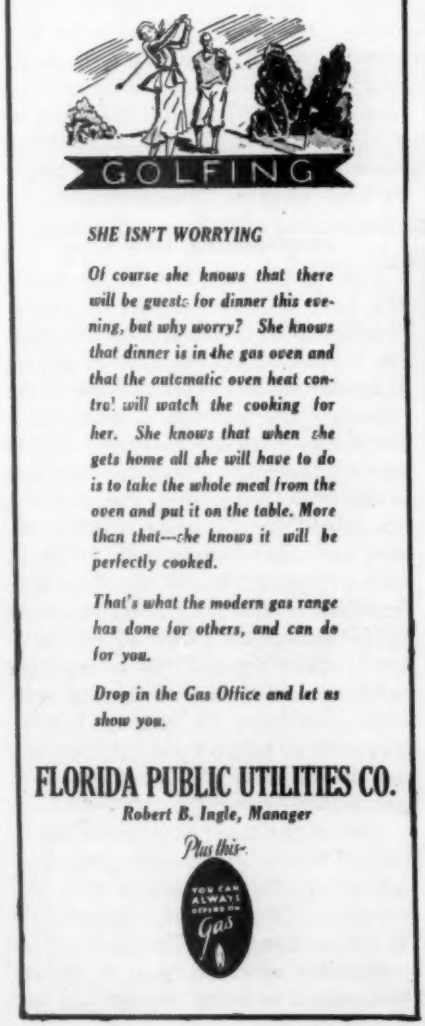
THAT when a gas man sends out a batch of direct mail advertising he will have made provision to follow it up consistently; that his list will be picked and his follow-up carefully planned.

THAT the gas man will fully realize and appreciate the value of planned newspaper advertising; that his newspaper advertising copy will be written and his schedules arranged with the idea of selling merchandising.

THAT so-called "dignity" in gas company advertising will give way to *"facts"* and *"what it will do for you,"* that good will advertising of the brand of 1929 is as dead as dead can be and that so-called good will advertising of the future will be of the human interest variety. There is plenty of interesting news in the gas industry if we'll but secure some one to tell the story in a readable way.

THAT you may think the prophet has no place in business any more but you're all—well check this list one year from to-day.

HERE'S an advertisement that makes a nice job of selling gas cookery, and coming as it does from way down in Dixie where the sun shines most all the while and folks have more mild weather and time for play, it puts over an effective message. We are of the opinion that the gas industry can stand a lot of advertising along this line. Sell the idea of gas cookery, refrigeration, water heating or what have you by telling folks what gas service will do for them.


GOLFING
SHE ISN'T WORRYING
Of course she knows that there will be guests for dinner this evening, but why worry? She knows that dinner is in the gas oven and that the automatic oven heat control will watch the cooking for her. She knows that when she gets home all she will have to do is to take the whole meal from the oven and put it on the table. More than that—she knows it will be perfectly cooked.
That's what the modern gas range has done for others, and can do for you.
Drop in the Gas Office and let us show you.
FLORIDA PUBLIC UTILITIES CO.
Robert B. Ingle, Manager
Plus this—
YOU CAN ALWAYS DEPEND ON Gas

GAS men who write advertisements will do well to plan to incorporate Service, Appearance, Convenience and Quality into their future productions. Folks are pretty well fed up on "Price Appeals" and are now seeking their

money's worth. Many have purchased cheap merchandise only to be dissatisfied with it and you may rest assured that when they go out to re-equip their kitchens they are going to buy built-in values.

NOW is the time to give careful thought to the matter of making homes comfortable in the summer via air conditioning equipment. Most of the country has just gone through a siege of scorching weather, sizzling days that even folks with considerable wherewithal could not escape. Surely there must be a worth while percentage of these who would be willing to pay money if they could be assured of a refreshing sleep during the night. But we must have the equipment to do the work and sell it.

Effective Advertising Appeals

Analyzed by the Copywriter

YOUR MONEY'S WORTH

A FEW months ago we spoke of the power of pennies as an advertising appeal. We were thinking then in terms of economy, which is always timely, and it is true that the necessity for economy has been, with most people, not only timely but pressing during the past few years. In June we wrote about Style and predicted that the buying public once more would soon be looking for better things and competing for their possession.

It happens that these two items are intimately related through a third, which can best be described, perhaps, by the caption above—"Your Money's Worth." It is amazing the extent to which this thought has suddenly dominated almost all public utility advertising, gas and electric as well, from one end of the country to the other. Actually, it is the utility's answer to the present widespread agitation for lower and even lower rates. But it is also something else. It is one of the best opportunities that advertising has ever enjoyed to demonstrate its value to the operating utilities; and it would be regrettable if full advantage were not taken of it.

Crux of the Problem

Briefly, the problem is to educate the consuming public to appreciate the value of the service which the gas company renders. Whatever politicians and professors may say, the public is honestly concerned with lower-rate movements only when it feels or is made to feel that the service companies are milking them without offering a commensurate return. Too many people have an exaggerated idea of what it costs them to use gas for cooking, water heating, refrigeration, etc. They do not regard the monthly gas bill as a composite invoice for a variety of services, nor as an accumulation of daily units of consumption, which are so small individually as to be almost negligible as a part of the household budget. It would be a great thing for the gas companies, however lacking in feasibility, if the gas bill could be rendered each day, as well as being itemized down to the last detail of use. Since this is probably impossible, we must look to advertising to make these principles thoroughly and universally understood.

Emphasizing Low Cost

During the past few weeks alone, we have received scores of advertisements from dozens of companies emphasizing the low cost and tangible value of gas service in its various applications. The most frequent—perhaps because it is one of the most effective—method is that of comparing the cost of gas with that of some other commodity of familiar use. Thus, "You Spend More a Day for Smokes, Ice Sream, Gum, Than for Self-Action Gas Hot Water Service." That depends, of course, on whether your reader smokes or chews or eats ice cream; but in any case it helps to counteract the usual comment—"I can't afford a gas water heater."

One of the most expressive headlines in this connection was the following: "Your Pennies Pay for Comfort with an Automatic Water Heater." The advertisement then went on to say, "When you select a hotel room, you insist upon running hot water, even if the additional cost is a dollar or more per day. Yet this same convenience in your own home, day-in and day-out will cost you only a few odd pennies per day, less than you will pay for a good cigar, or a few postage stamps."

Of the same calibre is the message, simple and direct—"It Costs Less Than 1/10th of a Cent To Heat a Gallon of Water." This is followed by the reminder, "It is impossible to estimate the real value of hot water in the home. There are times in emergencies, such as illness, when the value of hot water cannot be estimated in dollars and cents." It is "Not a Big Item on Your Gas Bill, but Oh, How Comforting!"

Another way of putting it is by what might be called the process of substitution: "Would You Stoke Your Neighbor's Water-Heater for 10 Cents Per Day?" You won't save that much by stoking your own. Or this: "Anyone Who Puts Up with Old-Fashioned Heating Is Working as a Day Laborer for 10 Cents a Day."

The Fact of the Matter

The fact which most people fail to realize is that, in the majority of cases, gas service is something deliberately chosen to perform a certain task that might be done in one of a number of ways. The only reason gas has been selected is that it is better or cheaper—or both. Talk of the gas company being a monopoly that compels the public to use its product at exorbitant rates is manifestly absurd.

The gas industry *as we know it today* is only about forty years old; and people at least thought they were comfortable before the gas range was invented. Therefore, it is well worth advertising that gas, and modern appliances, are savers of money besides being objects of convenience. They "Make Your Dollar Go Further." Gas cookery is "A Proven Economy," with highly interesting statistics, if you care to use them, from tests conducted by the laboratory of the American Gas Association. Five pennies will pay the entire cost for fuel to cook a complete dinner for the average family when gas does all the work. This figure may be even less in your territory. At any rate, it is worth finding out if for no other reason to advertise that "Small Change Does a Big Job!"

Worth the Effort

It may take a long time to get the story over, but it is worth all it costs if people can finally be imbued with the idea that "It's Not What You Pay—It's What You Get" that counts where gas service is concerned. For the value is there, and every dollar is well spent. Just keep hammering that home, even if it's the only advertising you can afford to do. "Where Else Can You Get Such Values?" "Afternoons for Sale." "More Service for Your Money." "Adding Years to Mother's Life." "Saved! A Two Weeks' Vacation Each Year with Gas for Cooking."

These are just a few of the typical headlines that indicate the variations to be played on this theme —a theme that is truly "Music to the Ears of Thrifty Housewives", as one company expressed it. What homemaker, struggling with an inflexible budget, won't respond to the offer—"Let a Gas Range Increase Your Savings"? What cook won't gain a new idea of the economy of gas through learning about "The Chef That Cooks Meals for a Penny"? When visitors compliment you on the appearance of your all-gas kitchen, you can truthfully say, "It Costs So Little." There is real satisfaction and justifiable pride in knowing that your household equipment represents "Far More Value Than the Price Suggests", because it is "A Saving in More Than Money."

it costs less-
than
1/10 of a Cent
ONE CENT
to heat a gallon of water ....
It is impossible to estimate the real value of hot water in the home. There are times in emergencies, such as illness, when the value of hot water cannot be estimated in dollars and cents.
Because ready hot water, furnished by an efficient water heater is so valuable many people are of the opinion that it is expensive. Such is not the case. IT COSTS LESS THAN ONE-TENTH OF ONE CENT TO HEAT A GALLON OF WATER. And a good water heater will give more than ten years of honest, dependable service.
HOFFMAN HEATERS
Are Featured
In March
Each month one particular make of water heater is featured on the sales floor of Public Service. This month we feature the well-known Hoffman Heater. Every Hoffman heater bears the Blue Star Seal of the American Gas Association laboratories, and can be depended on to furnish a constant, never failing supply of hot water at the turn of the faucet. Inspect the new Hoffman at Public Service now.
Seven Standard Makes to Select From
For As Low As $5.00 Down
The Water Heater Dealers, Licensed Master Plumbers and New Orleans Public Service have entered into a co-operative arrangement making it possible for you to have a standard make water heater installed in your home for as low as $5.00 down with the balance, if you wish, added in convenient terms to your gas bill.
A complete display of the following make heaters is maintained by Public Service and can be seen and purchased now: Hoffman, Humphrey-Ruud, Pittsburg, Ideal-Metcoil, Kol-Ite, Ever-hot, and Crane-Premier.
New Orleans Public Service Inc.
New Orleans Water Heater Dealers and Licensed Master Plumbers

A Striking Ad From The South

Fortunately we can say without exaggeration, when talking about gas service—whatever the application—"The Best Is Also the Cheapest." Our customers should never be allowed to forget that gas is the cheapest single item in the home budget; for most functions it is as inexpensive as the daily paper. In terms of comfort received, it costs less than any comparable means of achieving the same end. "All Things Considered Automatic Gas Heating May Be the Cheapest Way To Heat Your Home."

Remind the public of the fact that it may be more costly to be without gas service than to pay the comparatively small cost of having it. A favorite advertisement of ours is the one on house-heating that tells of the man who "Didn't Order Ashes, But He Paid for Them!" This may be followed up by the assertion that "Many People Spend Thousands of Dollars for Heating Comfort—And Fail to Get It!" Or the thought—"The Unnecessary Part of your Present Fuel Bill Would Buy You a Gas Furnace."

Utility executives often pay far too much attention to the politician or agitator who gets into the newspapers and far too little attention to Dame Rumor who travels by the grapevine route: "And all who told it added something new; and all who heard it made enlargements too." That is the source from whence comes most of the extravagant ideas about the high cost of gas.

Good advertising tells the facts in simple, but dramatic and always understandable terms. Such as

"If Cost Is All That Matters . . . Let's Go Back to Horses." Or this: "I Saved Money the Best Part of the Year . . . For 12 Months I Saved More Than Money Could Buy." Get the public in the habit of "Counting The Cost of Comfort," and realizing that "The Woman Pays Because Men Hesitate."

There, too, is the point of strategy; for it is Mrs. Homemaker, and she alone, who knows the true value of gas service in the home. She is already half on our side. To win her all the way, give her a continuing demonstration of how her "Pennies Work for Hours" at spring cleaning, holiday cooking and scores of other tasks that would consume her time and energy if it weren't for gas. Do this in your advertising even if you have to forget, now and then, about broadcasting the latest wrinkle in a gas range or refrigerator. People will turn to the new appliances quickly enough, once they are convinced that any other course is "Penny Wise and Foot-Pound Foolish."

"Convenience Is Not Costly," though worth all it costs. This kind of "institutional" advertising is also one of the best types of promotional copy you can run.

Gas Appliance Manufacturers Organize to Further Industrial Recovery Act

A LETTER from John A. Fry to gas appliance manufacturers brings out the following:

A series of meetings held by gas appliance manufacturers since the passage by Congress of the National Industrial Recovery Act have culminated in the organization of the following institutes: *Gas Range Institute, Gas Water Heater Institute, Gas Space Heater Institute, Gas Boiler, Furnace and Conversion Burner Institute and Gas Appliances Institute.*

The purpose of these organizations is to cooperate with the President of the United States in effectuating the requirements of the National Industrial Recovery Act and each institute has adopted a constitution and by-laws and an outline of a code of fair competition.

The *Gas Range Institute* has elected as its governing committee the following:

Chairman Mabon P. Roper, Geo. D. Roper Corp.; vice-chairman, Stanley Grady, Roberts & Mander Stove Co.; C. R. Graham, Jas. Graham Mfg. Co.; F. J. Hoenigman, Cribben & Sexton Co.; R. B. Hurt Hardwick Stove Co.; D. F Kahn, Estate Stove Co; R. M. Leach, Glenwood Range Co.; Walter Nagle, Baker-Nagle Co.; C. E. Smith, Detroit Vapor Stove Co.; Arthur Stockstrom, American Stove Co.; P. R. Tappan, Tappan Stove Co.

The *Gas Water Heater Institute* has elected as its governing committee the following:

Chairman, W. T. Rasch, American Gas Products Corp.; vice-chairman, Scott Fowler, Lovekin Water Heater Co.; F. W. Shuell, Everhot Heater Co.; Frank Adams, Surface Combustion Corp.; W. J. Bailey, Day & Night Water Heater Co.; Raymond W. Baker, Welsbach Co.; Walker H. Bowman, Jr., Hoffman Gas & Elec. Heater Co.; N. R. Feltes, Bastian-Morley Co.; Arthur Friedman, Cleveland Heater Co.; R. E. James, Rhiem Mfg. Co.; R. H. Lewis, Ruud Mfg. Co.; J. J. Whitehead, Jr., Whitehead Metal Products Co. of N. Y.

The *Gas Space Heater Institute* has elected as its governing committee the following:

Chairman, Carl E. Froelich, Continental Stove Co.; vice-chairman, Wm. F. Sharpe, Ohio Foundry & Mfg. Co.; E. C. Adams, Adams Bros. Mfg. Co.; G. C. Blackmore, Automatic Gas Steam Radiator Co.; J. D. Kennedy, Cahill Co.; L. F. Ryall, General Gas Light Co.; Pacific Coast representative to be elected.

The *Gas Boiler, Furnace and Conversion Burner Institute* has elected as its governing committee the following:

Chairman, Frank Adams, Surface Combustion Corp.; E. P. Bailey, Jr., Bryant Heater Co.; H. P. Mueller, L. J. Mueller Furnace Co.; W. T. Rasch, American Gas Products Co.; Pacific Coast representative to be elected.

For the purpose of coordinating the activities of all gas appliance manufacturers and to establish an agency through which gas appliance manufacturers can appear before the President of the United States, the *Gas Appliance Institute* was organized and has in its membership the four appliance institutes previously mentioned. The *Gas Appliances Institute* has adopted a Constitution and outline of code of fair competition and provision is made in the constitution for additional membership of other groups of gas appliance manufacturers or for memberships at large. The *Gas Appliances Institute* has elected as its governing committee the following:

Chairman, John A. Fry, Detroit-Michigan Stove Co.; vice-chairman, W. T. Rasch, American Gas Products Co.; E. C. Adams, Adams Bros. Mfg. Co.; Frank Adams, Surface Combustion Corp.; Arthur Friedman, Cleveland Heater Co.; Carl E. Froelich, Continental Stove Co.; F. J. Hoenigman, Cribben & Sexton Co.; E. L. Payne, Payne Furnace & Supply Co.; M. P. Roper, Geo. D. Roper Corp.

Recognizing that there will be considerable statistical and other information of a confidential nature required in the enforcement of any final code adopted, these groups have selected the firm of Frazer and Torbet, Board of Trade Building, Chicago, Illinois, as consultant and the confidential agency provided in the code to make statistical and other studies and to receive any report information regarding the industry.

The purpose of this letter is to advise all gas appliance manufacturers of the status of these various activities and to invite them, if they have not already joined, to join the particular institute determined by what their major product may be, by signing the constitution and by-laws of that institute; to invite manufacturers who are not now organized into groups to so organize and apply for membership in the *Gas Appliances Institute* and where it is not feasible to organize a group to invite such manufacturers as members at large of the *Gas Appliances Institute.*

Copy of the constitution and out-

line of code of fair competition of the *Gas Range Institute* has already been addressed to all gas range manufacturers in the United States; copies of the constitutions and outline of code of fair competition as adopted by the *Gas Water Heater, Gas Space Heater and Gas Boiler, Furnace and Conversion Burner Institutes,* will be mailed to the respective manufacturers shortly.

Notes on High Pressure Distribution

(Continued from page 27)

are not readily apparent on survey. These few indications are mentioned to call attention to the importance of determining the reason for growth to substantiate predictions.

An engineering rather than a financial attitude should predominate in all phases of reconnaissance, field survey, planning, construction and initial operation. The design should exclude territorial limitations such as political unit boundaries. The system as designed may not be entirely installed in the first construction program being restricted by financial or territorial limitations imposed by those empowered with such decisions, but the design will have provided for proper service on future construction at a minimum long period investment. An engineer must deal with facts of the past, present and, as far as possible, future and not with politics and finances, which are indeed more changeable than the physical characteristics of a territory.

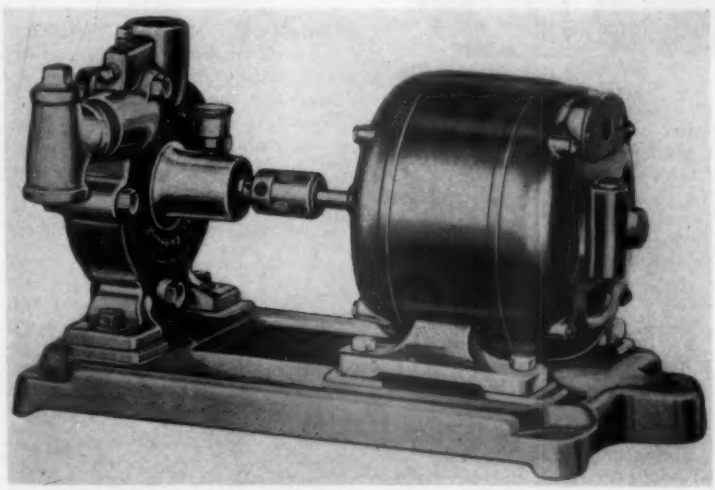
(Continued in September issue)

EQUIPMENT NEWS

Regenerative R-C-W Turbine Pump

Roots-Connersville-Wilbraham, Connersville, Ind., recently issued Bulletin 260-B10, illustrating and describing their Regenerative R-C-W Turbine Pumps. Some of the advantages claimed for this pump are that the taper-edge impellers make it possible to vary capacity over a wide operating range, to exact quantity required, adjustable while the pump is operating. It has only one moving part, a balanced impeller without metal to metal contact. Pump speeds are suitable for direct-coupled motor drive. Capacities range from 5 to 100 gallons per minute. It handles all kinds of liquids such as acids, ammonia, benzine, drip oil, etc.

Copy of bulletin will be mailed on request.



Regenerative R-C-W Turbine Pump

New 5-Inch Dial Thermometer

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., announces a new 5-inch dial indicating thermometer in a black bakelite case. This instrument was developed for equipment manufacturers who demand a moderately priced dial thermometer that stands up under severe operating conditions.

The new Tag dial thermometer has not been cheapened, it is in every respect a first quality, accurate temperature indicator, with an exceptionally powerful moving element or bellows suited to certain commonly used vapor tension ranges between minus 40 and plus 335° F.

The indicating pointer is actuated by the motion of a bronze bellows which expands and contracts at the slightest

temperature change at the bulb. This powerful motion is transmitted directly to the pointer by a new vibration-proof connecting mechanism.

The black bakelite case serves as a perfect contrast for the large clear-cut white numerals of the jet black 5-inch dial. With the instrument case mounted at a convenient distance to face the operators, the pointer of the TAG dial indicating thermometer can be read as easily and surely as the hands of a clock.

A special bulletin No. 1050 has been prepared by the Tagliabue Co. and will be sent upon request.

Stacey Brothers Get New Contract

Contracts have been awarded by the city council of Cedar Falls, Iowa, to Stacey Brothers Gas Construction Co., Cincinnati, O., for the construction of a 150,000 cu. ft. capacity gas holder, to be of riveted construction, ingot iron, and open hearth steel. The city will furnish its own foundation, bids having been taken with preference to local labor.

Ruud Water Heaters at Century of Progress

Ruud Manufacturing Co., Pittsburgh, Pa., have issued a circular showing the number of Ruud gas water heaters at the Century of Progress Exposition at Chicago, giving the sizes and location of installations. There are a total of 26 installations.

Special Tools for Cleaning Gas House Heaters and Boilers

Breuer Electric Mfg. Co., 869 Blackhawk St., Chicago, Ill., announce the "Tornado" portable furnace and boiler cleaner. Gas fired heating apparatus requires cleaning regularly to get the full efficiency of the heat units in the gas.

Before installing gas conversion burners the heating plant must be thoroughly cleaned to insure customer satisfaction with the use of gas fuel. The Tornado is

the only mechanical, heavy duty equipment especially designed to do this work.

The Tornado is a powerful portable furnace cleaner built complete with ten necessary attachments. Special set of gas tools can also be furnished.

Write for illustrated Bulletin, which contains a list of gas companies now using the "Tornado" cleaner.

Central Foundry Issues New Booklet

The Central Foundry Co., 421 Lexington Ave., New York, have just issued a 56-page booklet featuring Dual-Lok point pipe and fittings as well as their Universal cast iron pipe and fittings. The booklet is freely illustrated and contains a large number of specification tables.

Unusual Features in Philadelphia Gas Works Co. Gas Holder

Several unusual features are incorporated in the construction of the gas holder which was recently manufactured and erected at the Point Breeze Station A of the Philadelphia Gas Works Company, Philadelphia, Pa., by the McClintic-Marshall Corp., Bethlehem, Pa. This is a five-lift water sealed holder of the conventional type having a capacity of 10,000,000 cu. ft., and is contained in a tank 264'-8" in diameter by 41'-2" deep and guided in a frame of 26 columns and 7 tiers of struts.

Some of the features found in its construction that are not usually found in a gas holder of this type include the employment of electric welding in a variety of ways. The tank bottom was completely welded, the metallic arc process being employed. The guide frame columns are "tee" sections made by arc welding two beams together. Welding was also employed at many points in order to seal between members so as to prevent internal corrosion. Another unusual feature in the construction of the holder was the driving cold of all rivets in the tank shell, even though some were as large as 1⅝".

An elevator runs from the ground to the top of the guide frame.

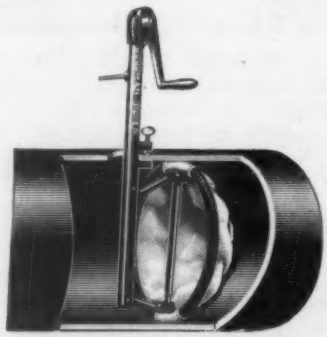
American Meter Company Issues New Bulletin

American Meter Co., 105 W. 40th St., New York, have issued Bulletin E-21, describing and illustrating a new metric Gravitometer. There are also several tables on temperature corrections for barometric readings.

Goodman-Peden Stopper

The Safety Gas Main Stopper Company of 523 Atlantic Avenue, Brooklyn, New York, makers of gas main stoppers since 1897, are introducing the Goodman-Peden Stopper designed by Mr. Hugh L. Peden, Superintendent of Mains of the Consolidated Gas Company of New York.

In this stopper the flexible frame, padding, covering and diaphragm of the Goodman Stopper remain in principle but the handles have been discarded and in



their stead a new arrangement in construction makes it possible to operate the stopper mechanically rather than by the skill of the operator.

Descriptive literature is now ready and will be sent on request to the Safety Gas Main Stopper Company at the above address or they will be pleased to send a stopper of the required size on trial.

Patrol Valve Issues New Booklet

The Patrol Valve Co., Locust Ave. cor. W. 114th St., Cleveland, O., has just issued a catalog bulletin on the subject of Patrol Temperature and Pressure Relief Valves for domestic hot water supply systems.

Personals

John J. Burns, for nine years investment manager for the Laclede Securities Company, St. Louis, Mo., has resigned from that position. He is a native St. Louisan and left high school to enter the employ of the old St. Louis Gas Company which was merged with the Laclede in 1890. He remained with The Laclede Gas Light Company until February 1, 1932, as head of various departments, serving as commercial manager for the last twenty-five years.

Mr. Burns is nationally known in the gas industry, having served as a member of the Advisory Council of the American Gas Association and for two years was chairman of the Commercial Section of the Association.

Mary G. Heist, an instructor in the Home Service department of the Philadelphia Gas Works Co., Philadelphia, Pa., for the past two years, has been appointed assistant to Miss Beatrice Cole Wagner, Home Service Director.

A graduate of the Germantown Friends' School of Philadelphia, Miss Heist later attended Hood College at Frederick, Maryland, where she received a B.S. degree in Home Economics in 1931. Shortly afterwards, she joined the Home Service department, being assigned to the Model Kitchen on the Broad and Arch salesfloor.

W. P. Southard, formerly vice-president and general manager of the Trinidad Transmission Railway and Gas Co., Trinidad, Colorado, is appointed to the position of vice-president and general manager of the New Brunswick Power Co., succeeding Albert E. Reynolds, who resigned to accept another position with the Federal Light and Traction Co.

Donald D. Hoover, assistant city editor of the Indianapolis *News,* has been made head of the public relations department for the Northern Indiana Public Service Co., Indianapolis, Ind., and has gone to Hammond to assume his new position. Mr. Hoover was formerly with the Associated Press in Washington. He has contributed to numerous magazines and is an associate editor of *The Quill.*

I. L. Frost, manager of the Interstate Company at Seymour, Ind., power and gas utility, has become president of the Seymour Rotary Club.

A. B. Millar has been reappointed Managing Director of the Pennsylvania Gas Association to serve during the current Association year. His office is in the Telegraph Building, Harrisburg, Pa.

W. F. Eve, Jr., manager of the Montgomery properties of the Alabama Utilities Service Company, has been promoted to the position of general commercial manager of the Atlanta Gas Light Company, as recently announced by W. W. Winter, vice-president and general manager of the company, in Atlanta.

Simultaneously with the announcement of Mr. Eve's promotion, J. W. Gates, division manager of the Alabama Utilities Company in Mobile, announced that **Maurice White,** manager of the Mobile Gas Company, had been promoted to succeed Mr. Eve in Montgomery.

Mr. Eve became Montgomery manager of the gas company in January, 1930. He was in charge when natural gas was turned into Montgomery and during his management over 1,000 new customers were added to the gas company's books.

Mr. Eve's new appointment becomes effective on Aug. 1.

Malcolm C. Heffelman, commercial manager of the Tucson Gas, Electric Light & Power Co., Tucson, Ariz., for the past year, has been appointed general manager of the Deming Ice & Electric Co. at Deming, N. M., it is announced by Max Pooler, manager of the Tucson utility concern. The appointment to the new position was made by the controlling company for both subsidiaries, the Federal Light & Traction Company. Mr. Heffelman's successor at Tucson has not yet been decided upon.

M. J. Collins has resigned as manager of the Independence Gas Co., Independence, Iowa. His successor has not as yet been named.

Roy Turnwall, chief engineer of the Davenport Gas Co., Davenport, Iowa, was recently named vice-president of the National Association of Power Engineers of Davenport at the annual meeting.

Rock G. Taber, vice-president of the Fall River Gas Works Co., Fall River, Mass., has resigned and has accepted a position as district manager for the Michigan and Indiana territory of the Central Public Service Company. Mr. Taber will have headquarters in Munson, Ind.

Norman B. Terry, assistant advertising manager of The Laclede Gas Light Company, was recently elected secretary of the Advertising Club of St. Louis, Mo. Mr. Terry has been active in Ad Club work for the past five years and in 1931 was awarded a silver loving cup in recognition of his services to the Club. He served for two seasons on the Board of Governors and as chairman of the cup awards committee. He has been with the Laclede company for the past six years, coming to St. Louis from San Angelo, Texas, where he was advertising manager of The Daily Standard. Since coming to the Laclede company Mr. Terry has gained considerable reputation as a copy writer, his advertising having won five national awards.

Ernest C. Kessler, who is head of a committee which is investigating the possibilities of a municipal gas plant in Jamestown, N. Y., has just been appointed to the board of public utilities of that city.

A. T. Schultz, former manager of the Havre-Chinook division of the Northwest States Utilities Co., has been named Montana manager for the company, with headquarters in Great Falls.

Mr. Schultz succeeds A. B. Aasness, state manager for the last two years. Mr. Aasness will return to the Black Hill district of North Dakota. Schultz has been connected with the company since March 1, 1932.

James W. Owens has been appointed consulting engineer and director of the new welding division, National Weld Testing Bureau, of the Pittsburgh Testing Laboratory, Pittsburgh, Pa.

R. C. Beebe of Mt. Clemens, Mich., has been appointed manager of the Muncie district of the Central Indiana Gas Co., Indianapolis, Ind., to succeed W. A. Bertke, who resigned recently. Mr. Beebe has been manager of the Michigan district and has been in the gas business 22 years.

Mr. Clarence H. Nichols, vice-president and general manager of the Federal Light and Traction Co., of New York, has been elected President of the New Brunswick Power Co., succeeding the late Edwin N. Sanderson.

Norman B. Bertolette, president, The Harrisburg Gas Company, Harrisburg, Pa., recently was elected a member of the Board of Directors of the Rotary Club of Harrisburg. Mr. Bertolette is also a vice-president of the Harrisburg Chamber of Commerce.

Menefee Wirgman, president of the Fidelity and Columbia Trust Co., Louisville, Ky., has been elected a director of the Louisville Gas and Electric Co., replacing Donald McDonald, Jr.

J. E. Braun has been named distributor of "Pyrofax," in Paynesville, Minn. Pyrofax is a bottled gas manufactured by Carbide & Carbon Chemicals Corp., New York City.

Mr. S. B. E. Thompson, general manager of the Bluefield Gas & Power Company, Bluefield, W. Va., and the Commonwealth Public Service Corporation, of Virginia, resigned August 1, 1933, from the above named companies, and will enter the natural gas business in this section in which he has interests. Mr. Thompson was active in the developments of the Mercer and Monroe gas fields of West Virginia, which are the most eastern natural gas fields in the eastern section of the United States; also through which the large 20-inch pipe line of the Columbia Gas & Electric pass on its route to Washington, D. C., and northern markets.

Bluefield, West Virginia, Roanoke and Lynchburg, Virginia, are situated closely to these fields and at the present time are without a supply of natural gas.

John T. Beasley, Terre Haute, Ind., president of the Indiana Gas Utilities Company, has been elected president of the Indiana Tax Payers Association.

Mr. H. G. McDonald, manager of the Asheville Gas Company, Asheville, North Carolina, will succeed Mr. Thompson as general manager.

All of the above named companies are subsidiaries of the Central Public Utility Corporation, now managed by Stone & Webster.

E. L. Brundrett retired from active service with The U. G. I. Company, Philadelphia, Pa., on July 1.

He first became connected with the U. G. I. System when he entered the employ of the Kansas City Gas Light and Coke Company in 1888. In 1890, he was transferred to the staff of the general auditor in Philadelphia as traveling auditor. During his service in this position he was temporarily assigned to Savannah, Concord and Atlanta as superintendent.

In 1895, the comptroller organized a New Business Department and placed Mr. Brundrett in charge as new business assistant.

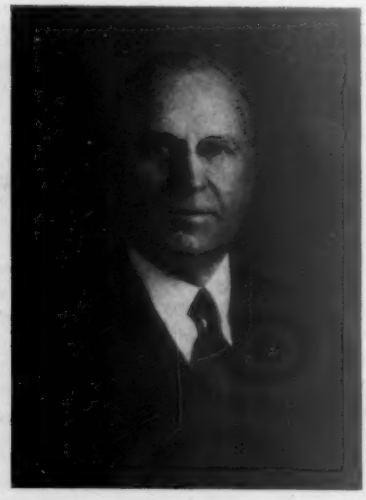
After five successful years, another step onward was taken with his appointment as general auditor. Ten years more passed and the introduction of natural gas in Kansas City resulted in problems which could not be solved except on the ground, which necessitated a man in charge with experience and judgment, one in whom the officers in Philadelphia could have confidence. Mr. Brundrett was chosen as the one best fitted for the position and was transferred to Kansas City as president of

the Kansas City Gas Company and Wyandotte County Gas Company. This position entailed great responsibility and strain, and after U. G. I. had disposed of its interests in these properties Mr. Brundrett suffered a breakdown. Upon recovery he was detailed to the staff of the general auditor.

Obituary

JAMES RANSOM McWANE

James Ransom McWane, president of McWane Cast Iron Pipe Co., Birmingham, Ala., and Pacific Coast Cast Iron Pipe Co., Provo, Calif., died June 24th, in Chicago, Ill. He was born at Wytheville, Va., Aug. 15th, 1869. After graduating from college he served as general manager of the McWane Plow Works, and from 1895 to 1903 was president of the Lynchburg, Va., Plow Co. In 1903 he went to Birmingham, Ala.,



to become president of the American Steel Castings Co. In 1907 he became vice-president of the American Cast Iron Pipe Co. In 1926 he organized the McWane Cast Iron Pipe Co., Birmingham, Ala. During the early part of the war he was major in the U. S. Ordinance Dept. and later became assistant to the vice-president of the Emergency Fleet Corp. He was chairman of the Cast Iron Pipe Trade Recovery Committee of the Cast Iron Pipe Research Assn. Always interested in the welfare of his community and was an active Y. M. C. A. worker.

WILLIAM MARKS

William Marks, 57 years old, maintenance engineer for the Citizens Gas Company of Indianapolis died recently at his home following an illness of one month. The widow, a daughter and three sons survive. He had been with the company 35 years.

NEWS of the GAS INDUSTRY

Public Service Electric & Gas to Reduce Rates

Public Service Electric & Gas Company, Newark, N. J., announces that it has filed with the State Board of Public Utility Commissioners a new Combination Service Rate for Gas, effective early next fall, that will substantially reduce the cost of automatic house heating with gas.

Gets McCarter Medal for Saving Chief's Life

Lafayette K. Williams, assistant night superintendent of The Philadelphia Gas Works Company, Philadelphia, Pa., has been awarded the Thomas N. McCarter Medal by the American Gas Association for saving the life of Robert Barr, Jr., night superintendent, by application of the prone pressure method of resuscitation.

Mr. Barr was attempting to close valves on connections between condensers and seal pots, seals having been broken and gas escaping, when he was overcome. Quick work on the part of Mr. Williams revived his chief and the latter required no further treatment.

The presentation of the medal to Mr. Williams was made at an inter-departmental meeting by P. T. Dashiell, vice-president of the Philadelphia Gas Works Company.

Gas Turned on At Mercersburg, Pa., For First Time

Gas was turned on for the first time at Mercersburg, Pa., by the Gettysburg Gas Corp., and a cooking school was conducted by the company in the high school auditorium July 19, 20 and 21. This town is the most distant from Gettysburg to be serviced by the company since it extended service to other towns in Adams County early this year.

New York Power and Light Has New Rate Schedule

The Public Service Commission has approved new schedules of gas rates charged by the New York Power and Light Corp. which will reduce bills generally by more than 12 per cent.

The reduced rates are effective in the Capital District which includes Albany, Troy, Rensselaer, Cohoes, Watervliet, Schenectady, and surrounding towns and villages; in the Glens Falls-Saratoga district which includes Glens Falls, Saratoga, Ballston Spa, Fort Edward, Hudson Falls and surrounding towns; in the Hudson district which includes the City of Hudson and town of Greenport; and in the Mohawk district which includes Amsterdam, Fort Johnson, Gloversville, Johnstown, and adjacent territory.

In addition to making general reductions in gas rates throughout nearly the entire territory of the company the new schedules establish single residential and single commercial rates in each district applicable to the entire usage of all customers, regardless of equipment installed, thereby eliminating optional rates. The new schedules also consolidate the rate districts and unify the rate structures, and establish gross and net rates as an inducement for the prompt payment of bills.

Plan Reorganization for Kentucky Natural Gas Company

Reorganization plan for the Kentucky Natural Gas Company, which serves several southern Indiana cities, has been approved by Judge Robert C. Baltzell in Federal court in Indianapolis on recommendation of a special master in chancery. The action covers Indiana assets of the company, similar action having been taken in Kentucky and Delaware. Under the provision of the reorganization plan, assets of the Kentucky company and its subsidiary, the Indiana-Kentucky Natural Gas Corporation, will be transferred to the new Kentucky Natural Gas Corporation. Holders of $1,000 bonds will receive ten shares of preferred and five shares of common stock and holders of unsecured debts, totaling $3,400,000, will share in an $818,781 distribution.

Danville Natural Gas Files Articles of Incorporation

Articles of incorporation have been filed with the secretary of state in Indianapolis by the Danville Natural Gas Corporation of Danville, Ind. The corporation is formed to drill and produce natural gas and has an initial capital stock of $100,000 divided into 1,000 shares having a declared par value of $100 each. The incorporators are Albert Kalb, George Gipp and Walter Fuhrman.

Central Power Moves Offices

Central Power Company has moved its Hastings, Nebr., offices to 220 N. Lincoln St., where additional space has been made available.

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

"We use CHACE BIMETAL because IT MEETS OUR EXACTING REQUIREMENTS"

BIRTMAN ELECTRIC COMPANY Chicago

The only electric iron with ventilated all bakelite handle and shield—no metal to burn you. . . . .

BIRTMAN *Automatic* ELECTRIC IRON

CHACE THERMOSTATIC BIMETAL
"It Bends with the Heat"

Manufacturers choose Chace Bimetal for its accuracy, uniformity and dependability.
Sold in
SHEETS • STRIPS • FORMS

W. M. CHACE VALVE CO.

100 Pounds or More Cut to Medium or Low Pressure

GAS pressures of 50 to 100 pounds or more in tanks or transmission lines are reduced to medium or low pressure in the distribution system by the Fulton Toggled Reducing Regulator. It can be equipped to operate with either natural or manufactured gas, maintaining the desired delivery pressure with very little variation. For reversing furnaces, constructed with oversize valves. Also adapted for control of By-Product Coke Oven Gas. Ask for circular, No. 2573.

The Chaplin-Fulton Mfg. Company
28-40 Penn Ave. Pittsburgh, Pa.

FULTON TOGGLED REDUCING REGULATOR

Boonville Gas Company Files Articles of Incorporation

Articles of incorporation have been filed with the Indiana Secretary of State by the Boonville Natural Gas Corporation of Boonville, Ind., formed to retail natural and artificial gas to that city. The corporation has an initial capital stock of 250 shares having $100 par value each and 9,000 shares of no par value. The incorporators are R. C. Norton, Russell Harvey and Merrill Atkinson.

Centerville, Ind. May Have Natural Gas Before Next Winter

Unless citizens of Centerville, Ind., remonstrate, and there is no present indication that such action is contemplated, the city will have natural gas service before next winter. An indeterminate franchise has been granted the Indiana Gas Distribution Company by the Centerville officials. The company distributes Texas natural gas and operates a pipe line into Toledo, O. The Centerville line will tap the main trunk line near Middletown, Ind.

Michigan to Get New Natural Gas Line

Construction will be well under way in less than 30 days on 157 miles of natural gas main from the central fields to Pontiac and Flint, with spur lines to Bay City and Saginaw, A. Thomas Sarkisson, president of the Michigan Natural Gas Corp., Mt. Pleasant, Mich., recently announced. A survey was started late in June.

Gas Company Wins Portland Rose Festival Prize

First prize and a blue ribbon were given to the beautiful floral float entered by the Portland Gas & Coke Co., Portland, Ore., in Portland's recent "Rose Festival Parade." The design of the gas company's float depicted the word "Service" which was spelled out in front in white carnations against a background of greenery.

Philadelphia Gas Works Plan Reduction in Rates

At a recent meeting of the Philadelphia Gas Commission it was announced by Samuel M. Vauclain, chairman, that the commission had accepted and approved the recommendation of the Philadelphia Gas Works Co., Philadelphia, Pa., for a reduction in the price of gas used for heating, effective September 1. Gas consumed for cooking, water heating, and other incidental purposes by customers heating their homes with gas will be included in this schedule and it is estimated that the reduction will mean a saving of $106,000 a year to this class of customers.

The new rates will be 90 cents per M.C.F. for the first 2000 cu. ft. per month; 85 cents per M. for the next 3000 cu. ft. per month; 75 cents per M. for the next 15,000 cu. ft., and for all consumption over 20,000 cu. ft. per month, 50 cents.

The minimum annual bill under this schedule will be $100, as compared with the present annual minimum of $185. Under the present schedule, the charge for gas above a consumption of 20,000 cu. ft. per month is 65 cents per M.C.F.

Indiana Gas Distribution Company Is Granted Franchise

The final resolution unanimously approving the indeterminate franchise granted the Indiana Gas Distribution Company by Centreville, Ind., has been passed and the laying of pipe lines and mains will begin shortly.

Addison B. Day Medal of Honor

Through the generosity of Mr. Addison B. Day, a Past President of the Association, the Pacific Coast Gas Association is privileged to make an annual award of the Addison B. Day Medal of Honor to the Association member who is deemed to have rendered the outstanding individual service in behalf of the gas industry.

The award may be made for distinguished accomplishment in research; invention; operating methods or practices which reduce the cost of production, transmission or distribution, or which improve products or by-products; increasing the sale of gas, and outstanding sales development work, including advertising and publicity; development of new uses for gas; improved public or employee relations; promotion of safety; development of improved accounting practices; and new methods in manufacture, finance or rates.

Every member of the Pacific Coast Gas Association is entitled to make application for the Medal or to be nominated by his friends or the company employing him. Applications or nominations should be made to the Association prior to July 1 of each year. The judges will be the President and Vice-President of the Association and three members of the Association appointed by the President.

The presentation of the Medal will be made at the Annual Convention.

Convention Calendar

September

11-16 American Chemical Society, Chicago, Ill.
13-15 Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, Calif.
18-19 Canadian Gas Association, Ottawa, Ontario.
18-20 American Transit Association, Stevens Hotel, Chicago, Ill.
25-29 International Gas Conference and Fifteenth Annual Convention, American Gas Association, Stevens Hotel, Chicago, Ill.
25-27 British Commercial Gas Association, Bournemouth, England.

October

Wk. 11 National Association of Railroad & Utilities Commissioners, Cincinnati, Ohio.
24-26 American Petroleum Institute Chicago, Ill.

THROUGH "HOT SPOTS"

such as lime plant and cinder dumps, a 20-inch line of mechanical joint cast iron pipe carries mixed gas into the distribution system of a large city. One of the several mechanical joints made by members of this Association keeps this line gas-tight. Cast iron keeps it tight against corrosion. Address inquiries to The Cast Iron Pipe Research Association, Thos. F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

CAST IRON PIPE
with mechanical joints
Look for this Trademark

Gas Plant Reconditioned

The Court Street generating plant of the Sioux City Gas & Electric Co., Sioux City, Iowa, has been placed in working condition again at a cost of $5,000 after an idleness of nearly eight years. Similar reconditioning of the Water Street plant was finished a short time ago. Both plants will be used for emergency purposes.

New Gas Plant at Richmond, Ky.

Black and Veatch, Kansas City, Mo., have been designated by city officials of Richmond, Ky., to draw up plans and specifications for the new gas distribution plant, made possible by a loan of $40,000 from the R. F. C.

Service Gas Fired Boilers

SPECIAL TOOLS FOR CLEANING GAS BOILERS & HEATERS

WITH BREUER'S BALL BEARING TORNADO FURNACE & BOILER CLEANER

GETS NEW GAS USERS & BUILDS GOOD WILL

Before installing gas conversion burners the heating plant must be thoroughly cleaned to insure customer satisfaction with the use of gas fuel. The Tornado is the only mechanical, heavy duty equipment especially designed to do this work at a great saving in time and labor.

Also Bryant and other types of gas fired boilers must be regularly cleaned to give low cost gas heat. You can build good will and in addition earn a substantial profit on each cleaning job by offering these users Tornado Cleaning Service.

Tornado Furnace Cleaning Service gets you into the basement where it is easy to sell gas heating specialties and service of all kinds—an ideal merchandising method to increase gas use.

The Tornado is the most powerful portable furnace cleaner built complete with ten necessary attachments. *Special set of gas tools can also be furnished.* Write at once for complete information and list of gas companies now using Tornado Furnace Cleaners as good will and sales builders.

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for carburetting gas requires high pressure and high temperature.

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For Gasworks having no facilities to mix their own Sponge we offer our celebrated "Lux Sponge," guaranteed efficient for Coal or Water Gas.
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ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

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Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

Model Gas Plant Being Erected in Indianapolis

A model gas plant for the continuous hydro-thermotic manufacture of gas by direct heating is being erected at Eighteenth and Gant Streets, Indianapolis, by J. U. McDonald, an Indianapolis inventor. McDonald, who asserts that his method of manufacture can reduce costs of industrial and utility gas by 50 per cent, hopes to interest a number of cities in municipal ownership. The McDonald direct heating process, he claims, is unique in its continuity feature and leaves no by-products. He estimates 70,000 cubic feet of gas can be produced to a ton of medium Indiana coal at an approximate cost of 8 cents a thousand cubic feet.

Fredericksburg, Va., to Consider the Use of Natural Gas

The prospect of natural gas being brought to Fredericksburg, Va., within a year, to be sold to the city at a price not to exceed one-half of the cost of manufacturing gas in the municipal plant and with which it would be possible to heat homes for less than coal, was recently held out before the city council by two representatives of a concern which proposed to construct a pipe line into the Fredericksburg area.

The subject was referred to the finance and light committees of the council, the city manager, and the city attorney for investigation and report to a meeting of the council.

Air Conditioning

The Committee on Industrial Gas Research, A.G.A., announces that arrangements have been made for the installation of two additional Silica Gel rotary gas-operated summer air-conditioning plants. One of these will be installed by the Philadelphia Gas Works Company in a display house being erected in Philadelphia, and the other will be installed by The Peoples Gas Light and Coke Company in the clinic of the University of Illinois Medical School, Chicago.

Modern Gas Appliances Shown at Convention

The largest exhibit at the recent convention of the New Jersey State Hotel Association, held at Asbury Park, was a display of gas-burning kitchen appliances sponsored by the New Jersey Gas Association. Seven manufacturers, all members of the Association, participated in the exhibit which included many of the latest developments in ranges, bake ovens, broilers, automatic toasters, deep-fat friers and other gas-burning equipment. The appliances were effectively set off by an attractive background designed and executed by the display department of Public Service Electric and Gas Company.

It is estimated that approximately 18,000 persons attended the convention, reports the New Jersey Public Utility Information Committee. During the four days the Gas Association's exhibit was on display, numerous leads were obtained and several sales made. Representatives of gas utility companies in the State were in constant attendance at the exhibit to explain the advantages of gas-burning equipment to visitors.

Ogden Gas Company Moves Offices

The Ogden Gas Co., Ogden, Utah, recently moved to its new office at 2336 Washington Avenue. Larger quarters were necessary because of the company's expanding business. A formal opening was held and friends were invited to inspect the display rooms and the newest appliances for automatic gas refrigeration, cooking and water heating.

New Rates for Lynchburg, Va.

Lynchburg Gas Company, Lynchburg, Va., has made a reduction in gas rates estimated to save consumers approximately $12,000 annually. The new schedule, which recently went into effect, has been approved by the Virginia Corporation Commission.

Because the gas company increased its minimum charge from 65 cents to $1, the commission ordered this change to be advertised.

The Lynchburg city council, by resolution, agreed to the revised schedule of rates which affects domestic and commercial consumers.

New rates are $1 for the minimum or the first 700 cu. ft.; $1.40 per M for the next 1,300 cu. ft.; $1.20 for the next 8,000 and $1 for over 10,000. The old rate was $1.45 for the first 10,000; $1.40 for the next 15,000; $1.10 for the next 25,000; 90 cents for the next 30,000; 80 cents for the next 100,000 and 70 cents for all over 200,000.

Nine Engineers Appointed by Indiana Public Service Commission

Harry V. Wenger, chief engineer of the Indiana Public Service Commission, and nine other engineers on his staff have been reappointed by Perry McCart, commission chairman, with their terms to continue at the pleasure of Governor Paul V. McNutt. Wenger has been connected with the department nine years and has been chief engineer since 1927. Other engineers named are Hugh Abbott, W. F. Leboc, Herbert Hutchinson, William Roby, Earl Behr, Paul Barger, E. A. Johanningsmeier, E. R. Newcomer and C. J. Whitney.

83 Years of Continuous Service

On September 4, 1850, gas was turned on for the first time in the city of Chicago. The Peoples Gas Light and Coke Company's output was sufficient to supply 125 customers, the 99 street lamps and the lighting of the city's one public building.

Since then the city's population has been multiplied 118 times; the number of customers, over 6,000 times; the company's output, about 10,000 times. And from that September day in 1850 to this, the gas service has been continuous, every day and hour and minute; its continuity was unbroken even by the Great Fire of 1871.

Imperial Gas Company Moves Offices

The Imperial Gas Co., pioneer bottled gas operator on the Pacific Coast, has announced removal of its headquarters from Long Beach, Calif., to Los Angeles. A long term lease has been taken on a building at 4212 South Broadway, giving the company 15,000 square feet of floor space. A large shop and garage are accommodated in the rear of the building.

With the move to new quarters, Imperial Gas has completed arrangements to display and merchandise a full line of liquid gas burning appliances. Ranges and water heaters will be marketed in the name of Rockgas, which is the registered trade name of the company's product. Space heaters, radiant heaters, furnaces, the Electrolux air-cooled gas refrigerator, camp stoves, Welsbach gas lights, Hart brooders, special burners, special commercial appliances such as plumbers' pots, sterilizers, torches, are among the products which the company will now display and sell.

A new fuel going by the name of "Econogas"—a combination of Rockgas and a heavier oil product—has also been introduced by Imperial Gas Co. for water heating and heavier work.

Located at the new offices are A. N. Kerr, W. J. S. Burdick, and C. L. Kerr, president, vice-president and secretary, and treasurer, respectively of Imperial gas; and A. R. Howson of Rockgas Utilities Co., a subsidiary company also headquartered at 4212 South Broadway.

New Gas Company Chartered

The Niagara Natural Gas Co., Inc., of New York City, has been chartered at Albany with capital of 12,500 shares no par value stock to operate gas and oil lands. Barham R. Gray, Wm. C. Scott, Ernest P. Staub, of 49 Wall St., New York City, are directors and subscribers. Satterlee & Canfield, 49 Wall St., New York City, are attorneys for the corporation.

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METERS

Experience gained by the R-C-W organization in supplying equipment for plants engaged in the manufacture and distribution of gas is freely at your disposal. Write for more information.

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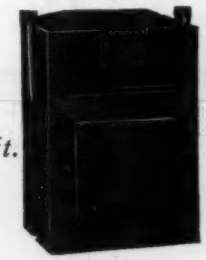
All sizes up to 3,400 cu. ft. capacity



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The Sponge with the large Tough Shavings Always Uniform

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Oil Gas Plants — "Refractory Screen" Process for Base — Standby or Peak Loads — On Existing or New Water Gas Sets Low or High B. T. U. Gas

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TRADE NEWS

Brewer & Gardner Buy Chemical Service Laboratories

J. Edward Brewer, Vice-president, and George S. Gardner, Chemist, of The Chemical Service Laboratories, Inc., Philadelphia, Pa., have recently purchased all of the physical assets of that company. Under the name of Brewer & Gardner they will conduct, with the same force, at the same address, an analytical and consulting laboratory, similar to that previously carried on by The Chemical Service Laboratories, Inc. Mr. Brewer who has had charge of the work of the laboratory for the past 16 years, will continue in the same capacity with the new firm.

The laboratory makes analyses of various materials, such as fuels, gases, tar and tar products, petroleum and petroleum products, and highway materials. Special emphasis is laid on consultation and analysis with reference to the problems of the manufactured gas industry.

Booklet on Air Issued

The American Radiator & Standard Sanitary Corp., 40 West 40th St., New York City has recently issued a new booklet entitled, "Romance of Air."

This booklet contains many interesting illustrations and topics on the value of air to the human body and also depicts the latest type of Air Conditioning equipment.

"Thiokol" to Be Sold in Europe

Thiokol Corporation of Yardville (Trenton), N. J., announces that through an arrangement just consummated with the Monsanto Chemical Works, Ltd., of London, England, "Thiokol" will be made available for sale and distribution in Europe.

"Thiokol" is the oil-proof, synthetic rubber which up to the present, has been manufactured solely in the United States and which is being used extensively in many industries.

The Monsanto Chemical Works, Ltd., is allied with the Monsanto Chemical Works of St. Louis, Mo.

Fisher Governor Company Announces New Representative

Fisher Governor Company of Marshalltown, Iowa, manufacturers of pump governors, pressure regulators, steam traps, liquid level controllers, strainers, and a complete line of similar automatic control devices, has announced the appointment of M. N. Dannenbaum Company, 304 Shell Building, Houston, Texas, as the direct factory representative in Southern and Eastern Texas.

Mr. M. N. Dannenbaum has just returned from the Marshalltown factory where he completed a detail study of Fisher equipment, to enable him to offer better service to the users of Fisher specialties.

Best Three Months in History

Reflecting the marked pick-up in industrial activity, Philgas Company, Detroit, Mich., liquefied petroleum gas marketing subsidiary of Phillips Petroleum Company, recently announced the opening of a new divisional sales and engineering office in Philadelphia to actively develop industrial gas markets in that vicinity, and the augmentation of its industrial division staff in other offices.

"Our sales of butane and propane gas to industrial plants in April, May and June were by far the largest of any three months in the five-year history of the company," said G. G. Oberfell, president, "and the business revival coupled with widespread acceptance of these economical industrial gas fuels has dictated the expansion of our marketing and engineering facilities."

The new office, located at 1608 Walnut Street, Philadelphia, will be in charge of E. A. Jamison, formerly head of Philgas Company's Milwaukee office. The post at Milwaukee will be filled by E. W. Evans, formerly located at Detroit headquarters of the company. Additional men have been added in the New York office, 80 Broadway, and in Detroit.

Welding in Maintenance

The Linde Air Products Company, 30 East 42nd Street, New York, N. Y., announces a new booklet entitled, "Oxwelding for General Maintenance." It contains sixteen pages and is well illustrated.

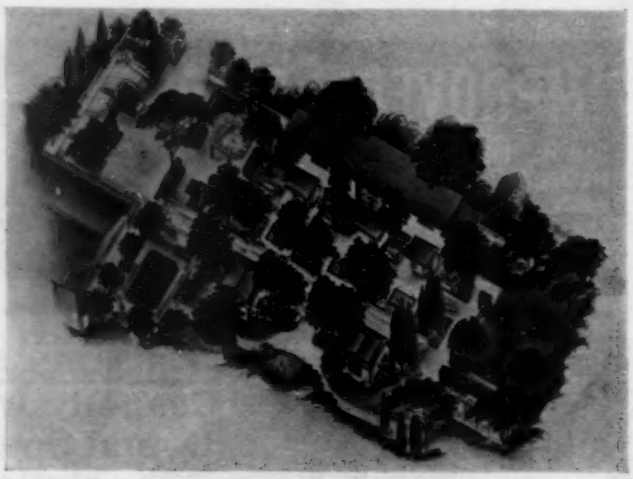
This booklet describes the use of the oxy-acetylene process of welding and cutting in reclamation of broken and worn machine parts, alteration, fabrication and installation of equipment. Among the various plant equipment covered are piping, tanks and containers, machine elements, engine and pump parts, frames and conveying equipment. Repair of worn parts by bronze-surfacing and hard-facing is given special consideration. Among the many illustrations is a chart giving thirteen simple tests for identifying the more common metals.

Fine Display of Hotel Equipment

The largest exhibit at the recent convention of the New Jersey State Hotel Association, held at Asbury Park, May 22-27, was a display of gas-burning kitchen appliances sponsored by the New Jersey Gas Association. Seven manufacturers, all members of the Gas Association, participated in the exhibit which included many of the latest developments in ranges, bake ovens, broilers, automatic toasters, deep-fat friers and other gas-burning equipment. The appliances were effectively set off by an attractive background designed and executed by the display department of Public Service Electric and Gas Company.

It is estimated that approximately 18,000 persons attended the convention. During the four days the Gas Association's exhibit was on display, numerous leads were obtained and several sales made. Representatives of gas utility companies in the state were in constant attendance at the exhibit to help explain the advantages of gas-burning equipment to visitors.

The New Jersey State Hotel Associa-



Artist's conception of the luxurious "Garden of Comfort" of the American Radiator and Standard Sanitary Corporation of the Century of Progress, Chicago. American Gas Products Corporation will occupy a prominent space in the building on the left.

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Has the increased Activity and Capacity to take care of added loads on purifiers

Gas Purifying Materials Co. Inc.
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Long Island City, N.Y.
Branch Yard
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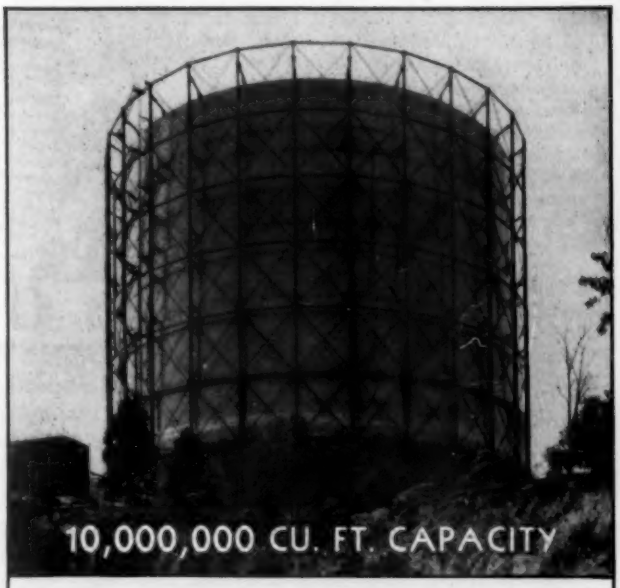

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and Management Corporation
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Standard Gas and Electric Company
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THE GOODMAN STOPPER
The Reliable Shut-Off for Street Mains
GOODMAN
USED SINCE 1897
2" HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER
Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.
Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

tion includes in its membership executives of most of the important hotels, clubs, and restaurants in the state. Inasmuch as manufacturers of competing fuels were planning to exhibit at this convention, executives of the New Jersey Gas Association felt that gas-burning equipment should be shown to the best possible advantage. Gas Association officials were extremely well pleased with the interest shown in the display by those who attended the convention.

The manufacturers who exhibited at the association's booths were: Standard Gas Equipment Corporation, Savory, Inc., Homestead Heater Company, Surface Combustion Company, Ershler-Krukin, Inc., Roberts & Mander Stove Company, Detroit and Michigan Stove Company.

Selas Company Expands

The Selas Company of Philadelphia, manufacturers of industrial gas heating equipment, has recently expanded its business to include the design and construction of special automatic machinery for all types of industrial heating processes. P. R. Hoopes, well known consulting engineer, has been retained as technical consultant on this work and will cooperate with the Selas engineering staff in developing automatic equipment for Selas customers.

Penrose R. Hoopes Moves Offices to Philadelphia

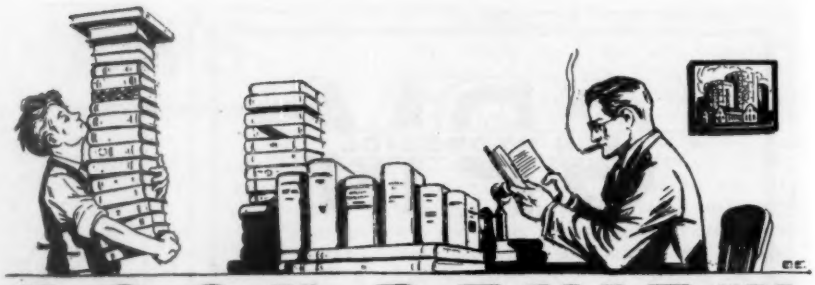
Penrose R. Hoopes, Consulting Mechanical Engineer, who for the past twelve years has maintained offices in Hartford, Connecticut, has transferred his business to Philadelphia, Pa., and is now located at 18th Street & Indiana Avenue in that city. Mr. Hoopes specializes in the design of automatic machinery and mechanical products.

Combustion Engineering Reorganized

The reorganization committee of International Combustion Engineering Corporation has announced that the plan of reorganization has been declared operative, but deferred, however, in including in such declaration the bonds and claims against Heine Boiler Company, a subsidiary.

The Combustion Engineering Company, Inc., has been organized as successor to the old company. The new company took over operations from the receivers on August 1st and also took possession of the assets and properties purchased at the receivers' sales.

The new company will have outstanding approximately $2,900,080 of first mortgage bonds, $1,000,000 of 5 per cent debentures and 150,000 shares of common stock. It will control the plants of Hodges-Walsh-Weidner Company, Raymond Brothers Impact Pulverizer Company and Coshocton Iron Company.



BOOK REVIEW

Mechanical Engineering Text

Steam, Air and Gas Power by William H. Severs and Howard E. Degler. Published by John Wiley & Sons, Inc. New York, N. Y., 480 pages. 284 illustrations. Price, $4.00.

While this volume was prepared for use in schools, its contents stamp it as a work that could well find a place on the bookshelf of practising engineers. This is so because of the terse but accurate manner in which various laws of heat and heat engines are set forth, thereby making for ease in quickly ascertaining certain desired information.

The usual fundamental laws of heat, gases, fuels and the like are discussed and the work proceeds to treat of such subjects as boilers and accessories, oil and gas burning equipment, feed water treatment, chimney and fan design, the steam engine and turbine, condensers and pumps, compressors, oil and gasoline engines, etc.

There is much in the volume that will be found of value to the gas engineer, especially where water gas manufacture is concerned.

As stated, the text is capable of being read and digested with entire lack of ennui and the graphs, diagrams and other illustrations have been interestingly rendered. Incidentally, students in gas engineering will also find this work of value from the standpoints of a text to be studied or for reference.

In addition to the illustrations there is a wealth of pertinent tables, including a large Mollier Diagram which is flap inserted in the back cover.

Some three hundred problems are presented for solution, these being included at the end of nearly every chapter. The cloth binding is durable and attractive.

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NOW ONLY $1.00 . . .

Salesmen of gas appliances can increase their sales when they have a thorough working knowledge of the functions and uses of each appliance.

This can be secured in a handy pocket-size edition of "Domestic Gas Appliances" by A. M. Apmann.

So that every salesman may have access to this valuable information, a special buckram bound edition is now available at a cost of only $1.00 each.

Though containing much technical information on every type of domestic gas appliance, this book is written so simply that the average salesman, whether technically trained or not, will find it an indispensable sales aid.

That ever-present question of comparative fuel costs and efficiencies is covered very thoroughly in this handy little volume. This data alone is worth the cost of the book.

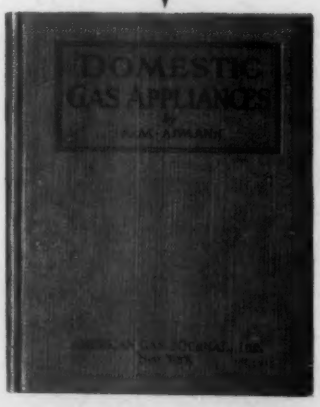
Read over the contents—Where can such a fund of information on gas appliances be secured at so small a cost?

"Intended to supply the gas salesman with enough information to let him know his products and their uses.

"Although intended for sales purposes the book contains considerable information of a technical nature. Chapters are included on fuel characteristics, fuel prices, and comparative fuel costs, which include statements of efficiencies and methods of estimating. Pipe capacities, meters and gas orifices are treated in such a way that the principles and operation are made clear. Much space is devoted to descriptions of existing types of gas-fired furnaces, boilers and radiant heaters; to laundry equipment, hot water heaters and to the gas refrigerators. A series of questions and problems is included at the back.

"A very useful book, and one that should be of interest to all who deal with domestic gas utilization."

Heating and Ventilating



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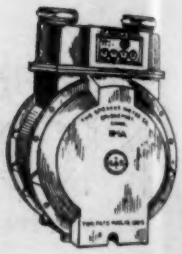

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